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**COMMUNITY FINANCING IN SIERRA LEONE:
AFFORDABILITY AND EQUITY OF
PRIMARY HEALTH CARE COSTS**

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**Submitted in fulfillment of the requirements of the
degree of Doctor of Philosophy
in the Faculty of Medicine, University of London**

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September 1992

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Abstract

Critics of user charges for government primary health care have focussed on the deterrent effect these charges might have on the poor, but there is little convincing empirical evidence that supports or contradicts these claims. The main research aims were to assess the equity effects of user charges for curative PHC services on households in 2 rural districts of Sierra Leone, a country that has suffered severe economic hardship in the last decade. Secondary objectives were to assess the feasibility of using objective means-testing to identify patients for exemption, and to recommend a simple methodology for acquiring the same information for local, operational purposes.

A survey of 1156 households was carried out in the dry post-harvest season, and covered a range of household economic factors in addition to the actions taken in response to all reported illness episodes. A followup survey was made the following rainy season to assess seasonal effects. Supplementary information was obtained through focus groups and case studies. The data were analyzed within the framework of a conceptual model which assumed that preferences, access, and ability to pay were the main factors (or groups of factors) that determined which of several medical and non-medical treatment options would be used. Multiple regression models were used to assess the effects of each group of factors.

The main findings were that, while wealthier households used cheap market drugs and expensive medical treatment options more than the poor, there was little difference in use of medium-priced PHC treatment. Household wealth and income factors correlated weakly with amounts actually paid for treatment. The immediate availability of money in the household appeared to be the economic factor most affecting utilization, with wealthier households nearly as likely not to have the amounts needed for PHC treatment on hand as poorer ones. Distance was a much more important determinant of choice of treatment than was income or assets, as were certain preference factors. However, the poor spent a much higher proportion of household income on treatment than the wealthy, so a way of limiting total expenditures for the poor would be more important than limiting their deterrence. Several readily-ascertained household factors correlated well with household income, but means-testing was concluded to be an inefficient way to accomplish the objective of selectively limiting expenditures unless incorporated into a prepayment scheme.

Acknowledgements

Planning and carrying out the research and writing this thesis was a long and rather lonely job, but some exceptionally nice people gave me help I needed along the way. I sincerely thank Anne Mills for the reliable supervision and incisive feedback which have given this thesis whatever degree of quality it may have, Lucy Gilson for raising my awareness of equity issues, and other members of the Health Policy Unit, and other departments of the LSHTM for their friendship, help, and encouragement.

I was fortunate enough to receive an Overseas Research Scholarship from the Committee of Vice Chancellors and Principals which made this mid-life intellectual journey financially possible. UNICEF's Bamako Initiative Management Unit in New York and the field office in Freetown supported the field research, with special thanks due to David Parker and Roger Wright. Words cannot express my appreciation of Dr Clifford W Kamara and the staff of the Planning, Management, and Information Systems Unit of the Ministry of Health in Sierra Leone. In addition to their all-out assistance collecting data for me in the field, I enjoyed delightful companionship and made what I hope will be many lasting friendships. My other muse besides Lucy was Paul Richards, whom I have never met, but whose jewel of a book about Mende rice farming systems explained many of the seeming paradoxes I observed in the field.

For moral support and hospitality during my time in England I am thankful for friends like the Wilsons, Su Hagan, Mike O'Leary, and for the remarkable generosity of the Dolans, which extended literally from start to finish. My daughter and fellow student Elise slogged diligently through the data entry verification process and was good company this past year in England. Finally, special thanks to Karen Courtright, the best of friends, who held the key to my completing this thesis and gave me constant encouragement and support.

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Abbreviations Used in the Text

ORS	oral rehydration salts
ORT	oral rehydration therapy
UNICEF	United Nations Children's Fund
PHC	primary health care
MCH	maternal and child health
BI	Bamako Initiative
GNP	gross national product
USAID	United States Agency for International Development
WTP	willingness to pay
ATP	ability to pay
PHU	primary health care unit
CHP	community health post
CHC	community health centre
VHW	village health worker
OLS	ordinary least squares
PMISU	Planning and Management Information Systems Unit
MOH	Ministry of Health
NHIES	National Household Income and Expenditures Survey
CSO	Central Statistics Office
CPI	consumer price index

Chapter 1:

Background to the research problem

In 1985 the author encountered a problem while working on a feasibility study for local production of oral rehydration salts (ORS) in Senegal. Several local manufacturers were prepared to produce and market ORS sachets, at a price which would ensure them a modest profit. The Ministry of Health thought that the retail prices the companies proposed (around US\$ 0.15) would be beyond the reach of poor people, and elected to continue buying ORS through UNICEF at about \$US 0.07 for distribution through government clinics. This decision prompted several questions: Do urban bureaucrats really know how much poor people, especially those in rural areas, can afford to pay? Why should there be a significant difference in affordability between 7 cents and 15 cents? And, is there any objective way to assess these factors and determine an 'affordable' price for ORS and other essential drugs used in primary health care?

These questions were the basis of the research problems explored in this thesis. The topic was a timely one, as user charges and cost-sharing have been strongly promoted (and hotly debated) as a solution to the crisis in health financing in developing countries. The research approach was developed at the Health Policy Unit of the LSHM in 1988/89, and the field research was carried out in Sierra Leone in 1989/90. The research questions evolved into a more general exploration of affordability of primary health care charges, but still are closely related to the original puzzle: how do the poor, particularly in subsistence farming areas, manage to cope with small emergencies; what factors affect their ability to pay the moderate sums associated with cost-recovery for curative PHC services; what is a practical way of defining affordability that will take into account the effects of payments on the overall welfare of the household and aid policy makers in pricing PHC services; and how can this information be obtained and used by policy-makers to make informed decisions about pricing.

1.0 Introduction

Among the problems inherent to the establishment and sustained operation of community-financing programmes for primary health care (PHC)

in developing countries, those factors which relate prices to community and household-level economics are perhaps the least adequately investigated. The prices set for services or drugs can affect access of patients to treatment, rational drug use, and utilization, but pricing has to date been mostly a subject of intuitive guesses. Guesswork has a place in planning, but carries with it the need for a trial-and-error approach. In an environment in which the health of many millions of people and the further support of international donors hinges on the outcome of primary health care (PHC) programmes, a more objective basis for planning that would increase the chances of success would seem imperative.

The aim of this research was to learn more about the factors that should be considered in decisions about pricing policy, by developing a framework for looking at local health and economic conditions that affect utilization and affordability of curative PHC services, to develop a set of practical assessment instruments for measuring them, and to show how the information obtained could be used. The approach would have a practical application in establishing pricing and exemption policies for community-based cost recovery programs. The major issues relevant to the research are outlined in this chapter, followed by a detailed review of the literature and antecedents to the research in Chapters 2 and 3. Chapter 4 provides background information on Sierra Leone, where the field research was carried out, and the research approach and methodology are described in Chapter 5. The analysis of the results of the field study are described in Chapters 6 through 9, and conclusions, policy recommendations, and evaluation of the research methodology are presented in Chapters 10 and 11.

1.1 User Charges For Primary Health Care

Government expenditure in the health sector in most developing countries decreased in real terms over the past decades, due mainly to the deteriorating economic environment. As a condition for structural adjustment loans, governments were advised by international development agencies to improve the efficiency of social services. In the case of health services, the recommended strategies included reversing the trend toward concentrating resources on secondary and tertiary care in urban areas, reducing the initial cost and the wastage of drugs, and seeking

additional sources of financing, including establishing user charges to pay for and improve health services.

User charges in government health services are considered feasible largely because people are now paying often substantial amounts for health care in the private sector. This care may not be of high quality, and drugs provided may be inappropriate or outdated. User fees, it is argued, can redirect this expenditure towards more effective government health services and better use of drugs. Even if people are not currently paying for care, the magnitude of household expenditure on non-essential consumption leads proponents of user fees to believe that some degree of purchasing power exists which could be exploited. Introducing fees for curative services may also promote more efficient use of resources by making both providers and users more aware of the costs of services. User charges for preventive services are generally not suggested for efficiency reasons, namely to encourage consumption of services that confer benefits to society in excess of those to users.

A hotly debated point concerns whether user charges potentially have a net positive effect on welfare. Revenues retained either locally or by the central Ministry of Health would in principle be used to provide better services through, for example, more reliable supplies of drugs, better supervision and training, improved staff morale, or even better geographical access through construction of facilities. Compared to the present situation in which government services are 'free' but rationed due to scarcity and of low quality, patients would pay more but would receive better care, getting better value for money than from the private sector.

Medicines have been singled out as a component of health care for which people have a universal desire and willingness to pay. The inadequate supply of essential drugs is suggested as a major reason why government health facilities in developing countries are underutilized. It has been proposed that governments could overcome the financial constraint to providing adequate supplies by charging for drugs at health facilities rather than providing them for free, and using the proceeds to purchase replacement stocks. So-called revolving drug funds have been tested in many forms, at levels ranging from individual village health

workers to national chains of retail public pharmacies. The partial, conditional success of such schemes was directly responsible for the launching of the Bamako Initiative, which originally aimed to improve the supply of essential drugs in sub-Saharan African countries by establishing revolving drug funds. This plan called for drug prices to be set above the cost of replenishing supplies, with the 'profit' to be used to cover the cost of improved PHC and Maternal/Child Health (MCH) care. Since its inception, the Bamako Initiative has shifted emphasis to the more general revival of PHC through decentralization and community participation.

Critics of user charges maintain that their effect is to improve efficiency at the expense of equity, and have focussed on problems of administrative complexity, the risk of policy distortions, and the need to protect the poor. Specific criticisms of the Bamako Initiative identified the danger of irrational drug prescribing, the failure to address the problem of the convertible currencies needed to make drug purchases, and the fact that the populations of sub-Saharan Africa are among the world's most impoverished. The implication of the latter point is that purchasing power may be too low for a significant percentage of costs to be recovered, and charges which would cover even the modest costs of PHC could exclude many people in need of services.

Some of the problems identified above are embodied in health delivery and management systems, while others concern community and household economic behaviour. Management issues can indeed be a critical constraint to community-level cost recovery, but at the same time a need exists for more objective methods of setting prices that take into account community and household factors in addition to cost recovery goals. While proponents of user charges acknowledge the need to set realistic cost recovery targets and to maintain equity among users of health services, a wide gap exists between this statement of concern and practical ways of implementing it. Both cost recovery and equity are directly affected by the way prices are set for services. These relationships are one of the main subjects of the research reported here.

1.2 Pricing, Demand, and Cost Recovery

The price schedule for services is the link between a community's purchasing power and the recovery of costs. Purchasing power may be thought of as the input, the revenues recovered as the output, and the price schedule as an independent variable or combination of variables that describe the treatment provided, the health problem, the level of service, the consumer, the season, etc., which determine the relationship between input and output.

If there are no economic externalities associated with a particular good, e.g., health care, given existing income levels, economic theory predicts that consumer welfare will be maximized by setting its price equal to the marginal cost of production. However, at this level, the distribution of income may well be such that certain individuals cannot afford the good. Social objectives may dictate that prices which deviate from this rule should be used to implement policies which compensate for inequality. A welfare-oriented pricing schedule may aim to simultaneously maximize revenues so services can be improved and minimize the negative effect of charges on all consumers. But given any functional objective, it is necessary to have certain economic information about the target population in order to devise such a pricing schedule. Good quality information at a local level about how much, and when, people can afford to pay for health care is mostly non-existent, and is often regarded as difficult to obtain.

The introduction of significant user charges has been a source of political discontent in developing countries. For health planners, the consequences of a bad guess at any of these parameters can also be serious: an otherwise well-managed revolving fund may enter a downward spiral of revenues and can go bankrupt if prices are set either too low or too high.

1.3 Ability and Willingness To Pay

The level of cost recovery possible thus depends largely on the aggregate willingness and ability of the target population to pay for services. If the community is seen as a monolithic body, there are no

further economic issues to be raised about user fees. Issues of equity and affordability arise because income and wealth are distributed unequally in populations, and because of the likelihood that, for poor households that already cannot afford sufficient basic needs, any incremental expenditures will have adverse health and social effects.

Much research on ability to pay (ATP) has focussed on measuring the price elasticity of demand and willingness to pay for health care. This emphasis on demand stems from the goal of setting prices to maximize revenue but to not deter people in real need from seeking treatment. There is evidence that user fees are regressive in that the burden of fees falls relatively more on low income patients than on the better-off, exacerbating inequity which may already exist in taxation systems.

Conventional studies of demand for, and utilization of, health services reveal little about the health-seeking behaviour of individuals, especially those who do not use health facilities, and they allow few conclusions to be made about the equity of a fee system. While the demand for health services generally decreases with increasing price, health care is not an ordinary commodity, and a community is far more complex than a multiple of the "average" individual. The meaning of an observed change or absence of change in utilization is ambiguous unless information about consumers is also known. The debate over equity continues largely because of the inherent complexity of the subject, and because many of the seminal studies can be faulted on technical grounds. The results of these studies are neither generalizable nor conclusive.

To place the research reported here in the context of what is known to date (reviewed in detail in Chapters 2 and 3), most early studies showed that demand for health care tends to be inelastic with respect to price, but later studies found significant deterrent effects on the poor, especially at higher prices. Most of the few longitudinal studies showed that utilization decreased significantly when user fees were raised, even at the low prices associated with PHC, and it is usually inferred that it is mainly the poor who are deterred. Yet the evidence that demand is relatively inelastic at the low price levels associated with PHC cannot be dismissed, and there is also a largely unexplored question of the effect

on demand when cheaper services (specifically, improved supply of basic drugs in public facilities) are made more accessible and the population can substitute them for private services of higher price and/or lesser quality. This is often the case when community-managed drug revolving funds are established, as under the Bamako Initiative. Overall, the results to date must be said to be inconclusive with respect to effects on equity.

1.4 The Cost of Paying: Defining Affordability

Demand is conventionally thought of as willingness to pay in conjunction with a range of preference factors. Little attention has been paid to ability to pay until quite recently. The inelastic demand observed for curative health care may be an effect of high willingness to pay for being cured of illness which may cause discomfort, loss of income, and risk of permanent disability or death. Under conventional pricing rules the price should be raised until demand drops off. If there are no household cash or liquid reserves, these amounts may be raised by mortgaging assets, incurring debt, disinvesting in capital, or reducing current consumption. If all options for curative treatment require fees, poorer households (which tend to have cash on hand infrequently) must decide whether to seek treatment, which source of treatment is likely to provide the most satisfaction at the least cost, and how to obtain the money in the least onerous manner. The true ability of a household to pay cannot be accurately assessed without an understanding of how these decisions are made and their various effects.

There is no accepted definition of 'affordability' in economics. Current expenditure on health care in the private sector or on 'luxury' consumption such as cigarettes is often taken as evidence of ability to pay, but little is known about how consumption choices are made or the effect of these payments on household budgets. A rule of thumb that one day's agricultural wage is an 'affordable' fee for curative care has gained acceptance because it happens to correlate roughly with the average price of an outpatient visit in some countries. None of this really tells us if fees are affordable. It is not the goal of this study to define affordability, but rather to shed additional light on the impact of user charges on the poor. The operational definition of an affordable health

care expenditure used in this thesis is *one which has no lasting adverse effects on the health, economic or social status of the household*. Since some people paying a given price could not actually afford it under this definition, the 'affordable' demand for services is lower than when long-term welfare factors are not considered. Consumption can be increased to previous levels by means of selective subsidies (e.g., exemptions), but in order to plan an optimal pricing policy for drugs, consultations, or risk coverage that attempts to balance revenues and equity, the effects of health care fees on households and the distribution of ability to pay in the community must be known.

1.5 Equity and Exemptions: What is Fair and Who Decides?

Introducing affordability and equity considerations into the pricing schedule would give planners some ability to ensure that new fees are not regressive, protect the poor, and perhaps compensate for existing unequal access to health services. However, equity is very much a subjective concept, and in order to determine how it can be introduced into a fee schedule, or to evaluate the effect of different pricing or exemption strategies, it is necessary to have a unique and consistent definition of the meaning of equity. This is often left to policy-makers at the central level to decide, but a cost-recovery programme could be seriously impeded if, for example, direct subsidization of the poor by wealthier members of the community is locally unacceptable.

Most proponents of user fees acknowledge that poor and 'vulnerable' (however defined) households should be exempt from health care charges, or protected from their effects to the same degree as the wealthy. This would require that prices are set very low to be 'affordable' by all, or that exemptions are granted for certain categories of users and/or a means-based sliding scale used. Setting prices for all very low implies a low amount recovered through fees, possibly less than the cost of collection and management. The second approach, of protecting the poor through selective pricing, is not without critics even in information-rich industrialised countries. In most developing countries the implementation problems are serious, especially in rural areas where there is little wage employment. Income and wealth are difficult to measure, and there is a multitude of

reasons why both users and providers of health services will distort the truth. Singling out the poor, or even asking questions about means, may be socially unacceptable. Even if means-testing is acceptable and cost-effective, there are few recognized objective criteria for determining the income level at which exemptions should be made, or for reliably identifying those individuals or households which should be protected. The need to know about affordability of fees for setting prices applies equally to decisions about exemptions.

Some argue that the pricing system need not be perfected to the point of exempting all who lack the means of paying because of the high level of solidarity in extended families and small communities in sub-Saharan Africa. The mostly anecdotal accounts of the existence of formal and informal social mechanisms say little about the degree of protection that can be expected.

1.6 Poverty and Rural Household Economics

Proponents of government user charges often assume that whatever households are currently paying for health care in the private sector must be an affordable amount, but logic suggests that this cannot be true for households unable to procure basic needs on a regular basis. The known effects of poverty on health and nutrition allow the classification of households by nutritional status and by the economic behaviour which is both a cause and an effect of this status. The working definition of the so-called ultra-poor (those who subsist on less than 80% of their dietary energy requirements and for whom any additional drain on their nutritional expenditures can have serious health consequences) may be useful as a general guide to a pricing policy, but is of limited use as a criterion for identifying individual households falling into this category.

If means-based exemptions are not adopted, equity could be improved by incorporating into the pricing schedule indirect indicators of need and ability to pay. A frequently proposed example of an objective proxy for means is the geographical location of the patient's residence: a lower fee is suggested for rural households than for urban on the grounds that most urban residents have higher cash incomes than rural farmers. Or within a

given rural area, price preference in the form of lower fees might be given to people who travel greater distances since they incur costs even before reaching a health facility. Other possible objective (i.e., readily obtained and not easily manipulated) proxies related to ability to pay are family size, number of young children, material possessions, type of housing, or amount of land under cultivation. But any proxy measure is an imperfect substitute for actual assets, income, and credit. The degree to which they "leak" benefits to the non-poor, fail to provide the intended exemptions, or are costly to implement, are criteria which determine their suitability. This research attempts to evaluate proxies for ability to pay.

Exemptions are also suggested for certain specific conditions such as tuberculosis and leprosy on the assumption that this improves the general welfare, and for specific economic groups such as students, prisoners, or civil servants, to compensate for low ability to pay. The principle of exempting specific health conditions or population subgroups also suggests a need to understand the population's own health priorities, expressed as their relative willingness to pay more for certain types of health services. Very poor people may be willing to pay more for relief from discomfort so they can go back to work, than for symptoms perceived as minor but which may in fact be life-threatening. Setting prices to help influence these preferences could help improve health status.

1.7 Seasonality and Prepayment

In much of the developing world, illness may be highly seasonal, as are availability of money and food. Maintenance of access to health care may be improved by changing prices seasonally to compensate for these factors. Seasonality is also an argument in favour of a system which requires prepayment of a certain fee at the beginning of the coverage period, which then entitles the person or household to treatment at no further or reduced cost for the period. If the initial subscription period occurs during a time of peak cash availability, it may be easier for most households to make the prepayment. Prepayment or insurance schemes are regarded as more equitable than fee-for-service because they spread the financial risk of illness among the healthy members of a group, but the

slow spread of these systems in Africa has raised questions of their acceptability at the community level. Ways to assess seasonal changes in ability to pay and the feasibility of prepayment were included in the research design.

1.8 Specificity and the Research Objectives

One reason that general, practical rules for setting prices for PHC have not yet been developed is that there is a great degree of variation between the communities in which reliable experiments have been carried out, and between communities in general. Many of the factors mentioned above which affect household welfare and the ability to pay for health services, and the relationships between them, are likely to vary between countries, between regions within a country, and even between nearby villages. This fact has been primary in the formulation of the research objectives and methodology: first, to assess economic factors related to choice of type of care and expenditure in different regions of Sierra Leone, and second, by means of analysis of the data collected, to develop practical approaches for generally assessing criteria for affordability and exemption on a local basis.

Chapter 2:

Review of Previous Work

Part A: Demand and Financing for Health Care, User Charges, and Pricing

2.0 Introduction

The research described in this thesis was stimulated by a current debate over user fees and community financing as elements of health policy, which can be traced to the worldwide economic downturn of the 1970's. Multilateral, bilateral, and non-governmental institutions joined in a search for solutions, drawing on experience in the industrialized world and sponsoring research in less developed countries. As is often true of research into social systems, much of the published material and the ensuing debate has had an ideological flavour, being "more characterized by argument than by evidence at present" (WHO 1988a). For example, the wider use of pricing policy in place of administrative controls to allocate resources was identified (World Bank 1984) as one of the themes of "a new vision of economic management."

The literature consists largely of 1) original papers published in health and economics journals, 2) economic studies on aspects of living standards and the demand for health care, most of which are widely-circulated internal documents of the institutions mentioned above, 3) policy statements and commentaries based on these studies, and 4) country and region-specific studies carried out by developing country governments and donor agencies, most of which are unpublished. This chapter a) traces the origins of the financial difficulties of health systems in developing countries and the solutions which have been proposed; b) reviews the antecedents of the current trend toward private financing of health care by means of user fees, including theoretical and empirical studies of demand for health care which have attempted to either justify the introduction of user fees or demonstrate that they can have a net harmful effect on equity and welfare; c) reviews pricing theory and actual experiences with user fees, and d) traces the development of the Bamako Initiative, which in its original conception as a continent-wide cost-

recovery scheme for essential drugs triggered a debate over the issues of affordability and equity.

2.1 Economic crisis, stabilization, and adjustment in sub-Saharan Africa

The trend of economic growth in most developing countries outside East Asia, and especially in sub-Saharan Africa, has been steeply negative in recent years. Africa's average per capita gross national product (GNP) shrank in the 1980's to barely over the level of 1967. The 3.4% average annual rate of growth from 1967 to 1988 just equalled the rate of population increase over the same period (World Bank 1989). Twenty-four countries, comprising 90% of the region's population, had lower levels of real per capita GNP in 1989 than at the beginning of the decade.

This dramatic fall in living standards was a result of external and internal factors. The major external factors were balance of payments problems and debt. While the few oil-exporting countries benefitted from the sharp increase in oil prices, most of the rest suffered from increased import costs and reduced demand for their exports. Declines in terms of trade were most severe in the poorer countries of the region (World Bank 1989). Many countries tried to cushion the sharp fall in balance of payments through international borrowing, in a period when world interest rates rose substantially (Abel-Smith 1986a), resulting in high levels of indebtedness and debt service payments for both the middle and low income countries of all developing regions. Africa's long-term debt rose 19-fold since 1970 and is now equal to its gross national product, making it the world's most indebted region. In 1983 debt service payments amounted to 27% of export earnings for the region (UNICEF 1990).

Internal factors have compounded the deteriorating balance of trade and indebtedness. War, ethnic conflict, and drought have affected much of sub-Saharan Africa. Political balance in the nations constructed from colonial empires is often precarious, requiring governments to give priority to maintaining stability through high military expenditures, to the detriment of social and economic policy.

Governments attempting to deal with macroeconomic crisis have had three strategies available to them. They could finance their current account deficits by international commercial borrowing and concessional import support by donors. Second, they could attempt to achieve their balance of payments and inflation objectives through demand management, with IMF-supported stabilization measures such as currency devaluation to encourage exports and discourage imports, and cuts in public spending and borrowing to reduce government budget deficits and inflation. Third, structural adjustment programmes to strengthen economies emphasized policy reforms to alter exchange rates, state-controlled prices and interest rates, and to support investment in key sectors (World Bank 1988).

The option of borrowing more was constrained by conditionalities imposed by potential lenders requiring the implementation of stabilization and adjustment policies, and economic problems in developed countries and altered donor policies meant that donors were unlikely to significantly increase their levels of assistance (Hoare and Mills 1986). The IMF promoted stabilization policies, arguing that short-term austerity would achieve the internal and external balance essential for restoring long term growth. Critics replied that the expansion of output of exports and import substitutes generally takes much longer in poorer countries which are mainly producers of primary commodities, subjecting the population to longer terms of austerity, and may undermine the prospects for long term growth by discouraging investment (Cornia et al 1987). The World Bank encouraged adjustment policies through structural adjustment loans, but a debate continues over whether the countries can bear the short-term dislocations while waiting for the anticipated positive results in the long term.

Some modest economic successes have been attributed by some to structural adjustment programmes: Ghana increased its GDP from negative growth in the early 1980s to positive, and Senegal increased food production and industrial output and reduced its deficit (United Nations 1988). Zambia, whose economy was among the worst in the region in the early 1980's, managed briefly to reverse its shrinking output and GDP, until riots protesting against the loss of jobs and subsidies forced the government to cancel the programme in 1987.

2.2 Effects on the poor

Criticism of these externally-imposed measures has centred on the unemployment and lower incomes while markets adjust, and on the reduced public spending which tends to remove any remaining "safety net" for the poor. The removal of subsidies has been an explicit element of World Bank policy: Bank public sector projects are expected to generate revenues which allow financial autonomy (Meerman 1983). The impact of adjustment policies has likely been hardest on urban waged workers because of the erosion of their purchasing power and the fact that urban populations have been the main beneficiaries of subsidized government services, but Cornia et al (1987) warned that all the poor could be affected.

Although the truly subsistence economy is rare (Jolly 1988), rural farmers, generally the poorest classes in Africa, may be the best insulated from government policy due to their subsistence and barter economy, and may even benefit from higher prices for export crops (UNICEF 1990), but the shift to cash crops may also leave the farmer at the mercy of market prices for the household's nutrition (Pinstrup-Andersen 1988.) In Zaire the traditional land surplus has been eaten away by population growth and the increased production of market crops (Cornell 1989), and in Kenya smallholders were considered vulnerable because of insufficient food production, and inadequate purchasing power (Wasonga 1988).

There is some evidence of structural adjustment's direct impact on household health and welfare. Falls in income, rises in food and fuel prices, and cuts in government services have been associated with increased rates of malnutrition in sub-Saharan Africa, and infant mortality rates declined in the 1980s less slowly than previously (Cornia 1989). Life expectancy declined in nine sub-Saharan African countries between 1979 and 1983 (World Bank 1989). Food comprises the largest budget component of the poor, and the price elasticity of demand for nutritionally high quality foods such as rice is much higher for poor than better-off population groups. Declines in calorie consumption have been documented in countries including Uganda, where the number of minimum wages needed to purchase minimum calorie requirements went from 0.6 to 4.5 from 1972 to 1984 (Pinstrup-Andersen 1988).

Reduced access to government health services in some developing countries has also been identified as a cause of declining health indicators. Low per capita incomes and correspondingly low revenue bases yield inadequate recurrent budgets, so many governments were unable to provide essential services to more than a small minority of their population. Abel-Smith (1986) concluded that most African countries experienced moderate decreases in real per capita government expenditure on health from 1979 to 1985, and that the shortage of funds seriously disrupted services in many countries. Average per capita total private and public expenditure on health in 1981/82 in low income countries (most of which are in Africa) was only US \$8.84, compared to \$30.93 for middle-income countries and \$670 for industrialized countries (World Bank 1987.) In general, countries with per capita GDPs higher than the median of \$350 increased their budget share going to health, and those below decreased it (UNICEF 1990).

2.3 Financing recurrent costs

As health budgets have declined, the efficiency of investment in facilities and the quantity and the quality of services have suffered due to decreases in the real value of health workers' salaries, reduction of budgets for fuel and vehicle maintenance that limit the ability to reach rural areas, reduced maintenance of physical plant, and cuts in drug budgets leading to shortages, ineffective treatment and decreased demand for services (UNICEF 1990). The gap between what is now spent on health care in LDCs and what is required to meet the estimated needs and make efficient use of resources was estimated in 1984 at US\$50 billion, and the estimated cost of full primary care coverage at \$15 per capita, versus the average \$2.30 spent on PHC by governments in less developed countries (Jiminez 1987).

Health sector financing options in the face of shortfalls in government revenues can be classed as public or quasi-public, or private (Zschock 1979). This is irrespective of whether the actual provider of services is the private or the public sector; this choice is largely based on historical precedent, demand for, and the ability of the sectors to supply, different kinds of services, and the relative efficiency of the two

sectors (de Ferranti 1984). Whether health care should be financed through private or public resources involves questions of how effectively the resources can be mobilized, of equity, and of allocative efficiency. A further, non-exclusive, option is to increase the efficiency with which existing resources are utilized, although it has been observed that significant additional resources may be required to accomplish this (Gray 1986).

2.3.1 Public and quasi-public financing

Options for public and quasi-public funding sources include taxation, external donor assistance, and social insurance schemes. Sources of general revenue in developing countries are often narrowly based, consisting largely of indirect taxes such as import and export duties. Receipts from direct taxes are typically low in sub-Saharan Africa (Mills 1983), as are other sources of revenue such as sales tax revenues, lotteries and betting. De Ferranti (1985) concluded that, given the general pressure on government budgets, there is little chance of mobilizing additional public resources for health from outside the health sector. Donor assistance is constrained by political and economic factors and is unlikely to increase significantly in the foreseeable future. Further, few donor agencies like to finance recurrent costs, and much multilateral and bilateral aid comes in the form of technical assistance rather than hard currency, or is earmarked for highly visible capital projects (Mills and Gilson 1988), or specific interventions such as oral rehydration therapy and immunization, in selected countries which demonstrate need (REACH 1989; Brenzel 1987). Social insurance, which usually provides the benefits associated with risk-sharing and prepayment, is a quasi-public method of financing through a tax on workers' salaries and wages. Common in Latin America, it is unusual in sub-Saharan Africa due to the small size of the waged sector.

2.3.2 Private and community financing

Institutions capable of influencing policy in developing countries, notably the World Bank and the United States Agency for International Development (USAID), have thrown their support to shifting the balance of financial responsibility for individual health care to private sources, with governments to assume final responsibility for indigents, public

health campaigns, and various regulatory functions (Hoare and Mills 1986). While a significant amount of health care is financed through private charitable contributions, in sub-Saharan Africa at this time private financing means in effect considering whether households should pay directly for services, and if so, what form such payments should take (de Ferranti 1985).

Partly in response to the PHC themes of self-help, utilizing local resources, and developing affordable and culturally appropriate delivery systems, governments and organizations have turned to communities to help support health services. Community participation can include financing through personal service fees, drug sales, pre-payment, labour contribution, or ad hoc contributions and fund-raising (Stinson 1982). Hoare (1987) and de Ferranti (1985) agreed that in the end it is the household or individual that must finance whatever services are provided; the community as a whole participates by finding solutions to problems which arise. Depending on the traditional form of social organization, a village health development committee may be the appropriate focus of decision making (Isely and Martin 1977).

2.4 The debate over user charges

Opponents of private payments for health care often refer to an ideological commitment to free health care as a basic human right which therefore should be provided by the state, and until the economic crisis many developing countries held this view strongly and tried to remove or reduce charges at public facilities. In contrast, Barr (1987) found the view that basic rights should be provided by the state to be illogical, observing that food is equally a basic human right which is provided well enough by the private sector; poverty may justify cash transfers but is not generally a justification for public provision of services. Considering the practical problems, Reddin (1987) concluded that both taxation and user charges can be progressive, but favoured providing free or low-cost services for all, financed by selective taxation, as having greater promise of fair and efficient allocation of resources than the alternative of selectively subsidising low-income groups through discriminatory pricing. Vogel (1988) concluded that optimal policy would require both income

redistribution and discriminatory pricing, at some acceptable level of administrative cost.

The theoretical foundation of the call for user charges by some economists is the view that government provision of free (zero-priced) health care harms personal welfare because government intervenes in the basically efficient distributional process of the market. Maximum efficiency in resource allocation will be achieved when goods and services are priced at the marginal cost of providing them. When external benefits are involved, the good or service should be consumed when its benefit to the individual plus its benefit to others are at least as large as those which could be produced alternatively with the same resources (Akin 1986). It is argued that individual and societal benefits would arise as user fees a) raise revenues for expanding and improving services, particularly PHC, redirecting existing demand for expensive private services toward possibly more effective government health services; b) promote by means of differential pricing more efficient use of services by discouraging unnecessary use of expensive, higher level care; c) encourage more efficient provider behaviour as patients signal their cost-sensitivity; and d) promote the development of insurance since without charges there is no incentive for patients to insure themselves. Noting that user charges have been reintroduced or extended in many industrialized countries, de Ferranti (1984) questioned how poor countries can provide free services when rich countries cannot afford to do so.

Opponents of user charges say that many individuals in poor countries do not have the financial means to pay the cost of services and that the poor may decrease utilization of health services, to their own detriment and the entire population (Sorkin 1986). Some believe that fees may also introduce inappropriate provider incentives, encouraging unnecessary interventions. The complexity of planning and managing fee systems may place great demands on already under-resourced public health systems, and the net level of costs recovered may be insufficient to permit service improvements (Gilson 1988).

2.5 Determinants of demand for health care

As mentioned in the introductory chapter, demand for a good can be thought of as a function of willingness to pay and ability to pay. Given that increased public spending on health services is unlikely, the argument for instituting selective charges for government health services is founded on economic theory and empirical evidence that individuals are generally willing and able to pay for private benefits. This evidence is reviewed in this section.

The traditional theory of demand for health (Wagstaff 1986) follows neoclassical consumer theory, making explicit the relationships between consumer preferences for health versus other consumption, prices of health inputs, the production function for health from health inputs, and income. It predicts that the rational demander will increase consumption of a commodity until its marginal benefit is equal to its marginal cost, and that an increase in the price of health inputs should lead to a deterioration in health status. The policy implication is that unrestricted free provision of health care to all, although equitable, will be inefficient in its allocation of resources by encouraging consumption up to the level at which the marginal utility to the consumer is zero. Akin (1986) identified the opportunity cost of seeking treatment as the fundamental determinant of how consumers allocate household income between health care and competing uses. Opportunity cost is the sum of the prices paid to get to the medical facility, to use the facility, and to buy any medicines required for treatment. All these prices have a direct money cost component and an indirect cost in terms of time.

Models which assume differing degrees of consumers' knowledge and ability to make choices about the consumption of health inputs lead to different conclusions about the equity and efficiency of providing 'free' health care. The 'human capital' model of Grossman (1972) assumes consumers have perfect knowledge of their own state of health, its rate of depreciation and the production function, and make investment decisions which in effect choose their lifespans. The paradigm of a rational utility-maximizing consumer may be inappropriate for the health care market, however. Apart from the existence of consumption externalities,

the consumer's knowledge of his actual state of health and the effects of alternative treatments is likely to be imperfect: in practice demand is often generated by the provider rather than the consumer.

The model of Phelps and Newhouse (1974) predicts that money price changes in the cost of care influence the quantity of care demanded, with time price effects also relevant. A reduction in the cost of care at the time of purchase (e.g., by public subsidy) will increase demand beyond the level that would be efficient in a pure market, requiring the rationing of supply. This theory therefore appears to support the call for user charges on efficiency grounds.

2.6 Empirical studies of elasticity of demand for health care

To set prices and exemption levels objectively, the functional relationships between the amount and source of health care consumed by a given individual should ideally be known with respect to (1) the individual's attributes such as age, sex, income, education, beliefs, (2) the provider's attributes as perceived by the consumer such as quality, price, distance from home, (3) the price of alternative providers or modes of treatment, and (4) environmental variables such as the season and cultural norms. These are most often described in terms of demand elasticity. The application of pricing principles would seem to be providentially easy once these elasticities are known. For example, Shepard and Benjamin (1988) stated that if demand is price-elastic, low prices can be used to encourage especially beneficial services and discourage less important ones. Where price elasticity of demand is low, user fees could be applied to all services, generating revenues without affecting utilization. Yet, for reasons to be described, empirical studies showing low price elasticity have not completely convinced those who advise caution in implementing user charges in developing countries.

2.6.1 Cash price effects

Data from the industrialized world have been used to suggest what the situation might be in less developed countries. Maynard (1979) concluded from developed country health service data that as prices rise the demand for the good or service priced decreases; the demand for substitute types

of medical care whose prices are unaltered rises; and the level of demand of lower socio-economic groups decreases.

Estimates of price elasticity in the U.K. suggested that the more urgent the event the less elastic the demand, with elasticity for hospital admissions in the range of -0.03 to -0.5, for short-term admissions of -0.63, for dental visits of -1.43, (Roberts 1989), and for NHS prescriptions of from -0.1 to -0.2 (Birch 1986). In industrialized countries income elasticity of demand for individuals has been estimated at from 0.1 to 0.45 (Roberts 1989), and close to 1.0 for aggregate national spending.

The relevance of this type of study even in developed countries has been questioned: Ryan and Birch (1988) found most studies of price elasticity failed to clarify the concept of demand where care is provided free or is highly subsidized and where demand is different from utilization because the provider and consumer do not agree about what level of care is required. Roberts (1989) observed that few studies actually observed price changes and other variables which may affect demand, and suggested that the inelasticity seen reflects the effect of provider-induced demand.

Most developing country studies have used household survey data in multiple regression models of demand. While not all studies agree, most confirm a fairly low cash price elasticity of demand for outpatient care. At public clinics in Malaysia (Heller 1982) it was estimated at -0.15, and for infant deliveries in the Philippines all money price effects were found to be in the inelastic range (Schwartz et al 1987). Kirigia et al (1989) found that demand was "fairly inelastic" with respect to prices at both government and mission hospitals in Kenya.

Later studies tried to incorporate income effects, since logic suggests that prices should have different effects on rich and poor. Heller (1982) found in Malaysia and Bitran (1988a) found in the Dominican Republic that higher income households were not more likely to purchase modern health care over traditional, and only a small positive association was found in the Philippines by Akin et al (1985). Schwartz et al (1987) found low income elasticity for deliveries. But income elasticity of demand for medical care in Indonesia was estimated at a relatively high 0.7

(Chernichovsky and Meesook 1986), with the authors concluding that low per capita income might be a barrier to access. Musgrove (1983) found income elasticity in Latin America to be high (average 1.17), with private care purchased only by high income households. Gertler et al (1987) used an innovative econometric technique with survey data from urban Peru, and found that demand became less price elastic as income rose, implying that user fees would reduce the access to care proportionally more for the poor than for the rich. Similar effects were found in Cote d'Ivoire, with price elasticities for clinic, hospital, and private doctor demand found to increase with decreasing income. Price elasticities in the higher price ranges approached -1.0 for the lowest income quartile in Peru (Gertler and van der Gaag 1989), and in Cote d'Ivoire price elasticities for the lowest income quartile were two to three times higher than for the highest quartile (Dor et al 1987). However, Shepard et al (1987) found price elasticity to be low (-0.3) for the lowest income group at a price level close to the full cost of medications for ambulatory treatment at government clinics in Rwanda. The conflicting results of some of these studies demonstrate that price elasticity is strongly affected by both income levels and the price range under consideration, making it difficult to generalize about price effects.

The price of alternatives is also an important determinant of demand. High cross-elasticity of demand for government services due to changes in private prices was found in Malaysia (Heller 1982). For adult outpatient care in the Philippines Akin et al (1986) found no important cross-price effects for public facilities, but higher drug prices in pharmacies increased the probability of using modern practitioners.

In some cultures health facilities are thought to be of low quality if they do not charge a price. This was found in the Ivory Coast, where most respondents said they felt better cared for if they paid money (Lasker 1981), and for mobile health teams and mission services in Zaire (Akin et al 1985). In Tanzania people seemed to value drugs they paid for at mission hospitals over those received free at government facilities (WHO 1988c), and in Sierra Leone compliance with TB treatment improved after a small charge was instituted in mission hospitals for drugs which government had required to be given free (personal communication). In the

Philippines, methods sold at very low prices were apparently viewed with suspicion by purchasers, but once that price reached a 'sufficient' level, the behaviour was as predicted by price theory (Lewis 1986).

2.6.2 Time and travel price effects

An early study in Côte d'Ivoire concluded that accessibility was a major determinant of utilization of modern health services (Lasker 1981). Akin et al (1981) found in the Philippines that waiting time and distance costs strongly affected relative demand for child health services, but Akin et al (1985) changed this conclusion, finding that up to a rather high threshold, travel distances and costs were less of an obstacle than commonly thought, and suggested that waiting time often has a positive impact on use since a long queue may connote a high quality service. Griffin (1987) dismissed the effects of time and distance on demand, concluding that they are generally smaller than expected and more sensitive to local conditions than price. This conflicts with many findings, e.g., time price elasticities for clinic demand in Cote d'Ivoire exhibited a range from -0.29 to -1.49 over the range of zero to two hours travel time, which would be well under Akin's threshold (Dor et al 1987). A non-linear effect was found in Swaziland, where it appeared that there was a threshold at 1.5 to 2 hours travel time, beyond which the costs of obtaining health care exceeded the benefits for most patients (Yoder and Herman 1985). The conflicting findings of studies not controlled for income were explained by Mwabu (1989): time price elasticity declines with decreasing income, but money price elasticity increases. Because the opportunity cost of time rises along with income, when time costs are present, the positive influence of income on demand is overcome by the increasing negative effects of the time price as income rises. This is somewhat at odds with the finding of Gertler and van der Gaag (1989) in Peru and Cote d'Ivoire that the money-poor are also time-poor, suggesting that access is most improved by increasing the supply of facilities in poor areas.

Clearly, cash price and incomes alone do not account for results such as Mwabu's (1986), who found in rural Kenya where there were several choices of providers that patients went first to free government clinics only 31% of the time. Quality, or users' perception of quality, is another determinant of utilization (Akin et al 1985), but has been the subject of

few studies because its measurement is difficult in comparison to other factors. Perceived quality may be correlated with price (Bitran 1988a), results obtained (Mwabu 1986), staff attitudes, waiting time, or the availability of drugs (UNICEF 1989). Findings indicate that quality is most likely to influence utilization when the user is wealthy and price is less important in determining demand, when the choice of provider is determined by illness-causation beliefs, when all options are cash-priced and equally accessible, and when the user knows from experience that there are substantial differences between available providers (Gilson 1988).

2.6.3 Why elasticity studies are inconclusive

While some developing country demand studies found low price elasticity, they either failed to consider all relevant factors simultaneously or did not distinguish between different price ranges as would be necessary when considering the effect of PHC costs, which are usually lower than hospital costs. The interplay of many factors makes it dangerous to apply general conclusions to particular cases. Griffin (1987) noted that none of the demand studies reviewed by him refer to actual field experiments in which user fees were introduced and their effects studied: "all are computer exercises... which make deductions based on cross-sectional comparisons among a sample of households." Deaton (1988) warned that using cross-sectional data for estimating price elasticities requires careful technique and advanced methods, and Bitran (1988c) criticized aspects of nearly every published demand study, including the appropriateness of definitions of important variables, the lack of price variation, inconsistency of the demand equations with economic theory, and the fact that many surveys were not designed for the specific goals of the study. He also critiqued the econometric models of Gertler and colleagues at the World Bank, which in the absence of user fees or using very low fee levels, used travel time to represent private costs. Shepard et al (1987) cited the inability to isolate the effect of the perceived different quality of services at various clinics as a possible source of error in their study.

Shepard and Benjamin (1988) criticized demand studies simply because their results conflict. Since about half the reviewed studies indicated a price effect and half did not, they speculated that price matters more in low income populations, and that the effect may be culture-specific.

Helminiak and Andreano (1987) explained differences in estimated demand elasticities by the differential impact of many factors on groups having different degrees of poverty, ill health, and health perceptions in different areas, with resultant varying impacts on demand, which will also vary through different price ranges.

2.7 Other demand studies

2.7.1 Aggregate demand

While purchasing power may be low, willingness and ability to pay for health is demonstrated by paying for traditional medicine and Western medicines of questionable value. Demand for modern care may be frustrated by shortage of supply, and people will pay for it if it is available and perceived as superior to traditional medicine (Carrin 1986a). Justification for user charges for government health services has been derived in this way from data showing that most people now pay for a large proportion of their health care either directly or indirectly. Shepard and Benjamin (1988) found that household spending on health averages 2.5% to 3.0% of household expenditures in low and lower-middle income countries. Private expenditures account for 15% to 55% of total national health expenditure in sub-Saharan African countries (Carrin 1986a), and Diarra and Coulibaly (1990) estimated that households paid 74% of overall recurrent health costs in Mali.

2.7.2 Prospective willingness-to-pay (WTP) questions.

Another way of assessing demand is to ask people how much they would be willing to pay for a particular service. This prospective type of questioning works well for services such as potable water, where consumption is regular and predictable, but it has been judged unreliable for health care, which tends to be of an emergency nature (Birdsall and Chuhan 1987). Prospective questioning was seen as less desirable than the actual observation of utilization and expenditures in health care since intent and action often diverge (Lewis 1987). While some studies have yielded results that seem reasonable, on balance information obtained from hypothetical questions is unconvincing. A study in Rwanda found 76% of low-income families willing to pay for a pre-payment card which would entitle them to a 50% discount at the local clinic (Shepard et al 1987),

but this strains credibility since the amount for which such high willingness to pay was expressed was equivalent to 71% of mean annual per capita cash income. For full coverage in Niger, 63% of households expressed willingness to pay more than FCFA 500, with the rate decreasing with socioeconomic status (Tulane 1987). This seems reasonable, as the amount represents approximately 1% to 2% of average per capita income. Empirical evidence of WTP also comes from Gertler and van der Gaag (1989), who derived independently from Peru and Cote d'Ivoire data that people will pay up to 2 to 5 percent of their non-food budget for medical care, but are unwilling to pay more. This is roughly equal to 0.5% to 1.5% of total expenditures for poorer households.

2.7.3 Other retrospective studies.

Some researchers have justified charges for health care in poorer countries on grounds that most households have some discretionary income. Birdsall et al (1986) reasoned that because 40% of household expenditure in rural Mali was for social activities, durable goods, and loans to others, households should be able to afford 5% of their total expenditures for recurrent costs of health and water projects. Households with cash income expressed greater willingness to pay for services, but the authors felt this to be an unreliable indicator because of large annual variations in income.

Assumptions about an entire population's ability to pay based on mean income data can be seriously in error. For a hypothetical country with an average annual per capita income of \$200, 60% of the population would have an income below \$200, and the lowest 20% would have a total income of only \$60, with perhaps only \$15 of this in cash (WHO 1988c). In the same district in Mali where Birdsall et al (1986) found evidence of ability to pay based on average income and expenditures, in a year of poor harvests the mean cost of care per episode of illness represented 8.5% of average per capita income, but because of the skewed income distribution it was 47.3% of the median per capita income. A significant percentage of all families had zero cash income and a large majority of families claimed to have difficulties financing their health care (Carrin et al 1988). A study in Senegal (WHO/DAP 1991a) demonstrated the contrast between overall and individual WTP by the fact that 66% of households bought the total of what

was prescribed at public clinics at an average cost of US\$ 9.00, but 16% of prescriptions were not filled within three days and 36% did not buy all the prescribed drugs. Fewer than half the patients said they would be able to spend more than US\$ 1.75 and only 23% more than US\$ 3.50.

Gilson (1988) observed that the population's willingness to pay for private health services in rural areas reflects the lack of government provision and the greater acceptability of the other services, but in neither case can it be assumed to reflect ability to pay, except for the wealthy. Striking evidence of apparent ability to pay comes from Zaire, where health zones establish fees independently and a high percentage of costs are recovered. Yet Bitran (1988b) found in two zones where collection of fees was rigorous that about one-third fewer lower-income households sought care outside the home than middle and high income households. Health center fees were significant compared to incomes (nearly 5% of annual per capita income) and while the proportion of health center patients who did not pay the full price of the services received was negligible, Bitran (1988d) implied that the interpretation of WTP data seems to depend heavily on the observer's predisposition toward user charges, cautioning that,

"this should not necessarily be interpreted to mean that all zone residents are willing and able to pay for services... health centers may get a biased sample of patients, namely those who can pay for their care... others may not be willing or able to pay and either go without care or seek cheaper forms of treatment."

2.7.4 Longitudinal utilization studies

While most studies of demand elasticity have relied on cross-sectional data, evidence of actual changes in utilization requires longitudinal data covering a period before and after the introduction of user charges, but studies of this nature are rare. Even when such data is available, the following examples demonstrate that pure price effects

may be difficult to interpret correctly because of the effect of quality changes and external factors, and counter-examples can often be found.

In Ghana, utilization of government clinics dropped sharply after fees were raised (Waddington and Enyimayew 1989). However, former levels were regained in urban areas after a year, and utilization of mission hospitals increased,

suggesting to the authors that consumers rated perceived quality of care even higher than cost as an element of the decision-making process.

A drop in curative care episodes correlated with an increase in fees was reported in Zaire (de Bethune et al 1989), but the longitudinal data presented can also be interpreted as not showing any drop in utilization until the fourth year of price rises, when the increase was the sharpest.

In Swaziland, a nationwide fee increase was followed by a drop in utilization averaging 17%, and visits for important preventive and curative services showed higher than average decreases (Yoder 1989). The authors noted almost parenthetically that the price increase studied was a drastic one-time rise of 300% (Yoder and Herman 1985). In the poorest region of Mali, fees were raised gradually over three years from 50 FCFA to 300 FCFA and utilization rates increased (Mandl and Ofosu-Amaah 1988).

In Mozambique, utilization of health services dropped by two-thirds after drug fees were raised to a level that covered costs plus a 70% markup (Kanji 1989). Drastic events were occurring in Mozambique at the same time as the price increases, including massive displacement of rural populations, declines in agricultural production, and a tenfold devaluation of the currency, making it difficult to substantiate that the drop in utilization was due directly to the price increase.

A fall of about 25% in outpatient visits was found in Kenya during the first month of cost-sharing, but there was no decline in inpatient admissions or utilization of free preventive services (REACH 1990). However, the authors could not explain these results, and recommended a household survey to include data on non-users.

On the other hand, patient attendance increased dramatically in Guinea and Zaire after the inception of essential drugs programmes which introduced charges but increased the supply of drugs and introduced charges (Jarrett and Ofosu-Amaah 1992), demonstrating the effect of an improvement in quality. It has also been suggested that the decrease in utilization in some countries after fees were introduced was a result of inadequate planning and public education (United Nations 1990).

2.7.5 Demand for medicines

Drugs play a central role in cost recovery: not only is the adequate supply of medicines in government facilities a major criterion by which

quality of services is judged, but the availability of drugs for self-treatment on the private market is an important alternative to medical treatment.

Drugs constitute a major component of recurrent costs and have been the focus of cost recovery efforts in many trials of user charges because of their financial significance, their importance in PHC, and people's high willingness to pay for them. A great but often irrational (by Western standards) demand for medicines is common to nearly all societies (Hall 1986; Fabricant and Hirschhorn 1987). The demand for drugs and pharmaceuticals tends to be price-insensitive in developing countries. Litvack (1988) found high utilization of private pharmacies in rural health zones of Zaire. Since these are usually more expensive than health centers, it suggested that many people who do not attend health centres are willing and able to raise the resources required for health care, and that adequate drug supply is a more important factor in determining utilization than price. Use of government facilities in Nigeria decreased one-half to one-quarter when drugs were unavailable (Sokoto State 1988).

Expenditure on drugs among the poor ranged from 0.7% to 1.6% of household expenditures in five countries (Mills and Walker 1983), but the low purchasing power of low income groups in poor countries makes them more dependent on government supplies which are usually inadequate (Hall 1986). Where this is the case the sick purchase drugs from private sellers, often for inappropriate and wasteful self-medication. Weekly family expenditure on drugs from pharmacies in two Brazilian villages ranged from a third to a full day of an individual's wages (Haak 1988), and prescriptions for Zairean workers without benefits (generally the poorest workers) often cost more than half a month's salary (Guimier 1988).

Even when people are apparently able to pay relatively large amounts for drugs, it may be with considerable difficulty. Carrin (1986b) found that 99% of prescriptions written were filled in a community pharmacy project in Chad where full cost price of drugs was charged, but they cost from 0.6% to 116% of annual per capita income of the poorest farmers. In Nigeria many patients failed to fill prescriptions at a teaching hospital, apparently because of price: for prescriptions costing from 1 to 9 naira

(1 naira = US\$ 1) the default rate was 17%, rising to 78% for prescriptions costing over 20 naira (Isenalumbe and Oviawe 1988).

2.8 Equity in private financing

Equity (the quality of being equal or fair) in health care can be defined on levels which range from the conceptual to practical indicators. Mooney (1983) offered a hierarchy of ways to judge equity, starting with the indicator of equal expenditure per capita, progressing to the ideal of equal health status. Expenditure per person needing assistance may be the best measure of equity in spending, but this may be distorted by differences in efficiency (Musgrove 1986b). Gilson (1988) favoured equal utilization for equal need as a definition which incorporates equity between, as well as within, population groups.

The debate over user charges centres around the apparently necessary tradeoff between efficiency goals and equity goals. Equity and efficiency are valued differently by societies, and therefore the goal can influence the mode of financing which is adopted (Brenzel 1987), and equity is itself a relative and subjective term. The various factors which contribute to health status must be examined in relation to different sections of society, with the term 'horizontal' equity being used to describe equity between geographical areas or any groups with some common characteristics, and 'vertical' equity for equity between unlike socio-economic groups. Achieving equity through such methods as discriminatory pricing implies cross-subsidization of the poor by those better-off, which might not be acceptable to the community. Rather than imposing external equity standards on a community in the process of planning, more must be known about how the community understands the concept. Carrin (1986) recommended that a community's own notions of equity should be taken into account in planning any community financing scheme, and the pitfalls in allowing economists alone to make decisions about setting health priorities in general were discussed by Green and Barker (1988).

It is argued that user fees can promote equity rather than reduce it. Jiminez (1987) noted that financing "free" services through taxation is inequitable because most taxation schemes are regressive. However, he

presented data that showed that while most health subsidies go to the most costly (i.e., urban) services, subsidies by income group are closer to neutral. In countries where taxation is neutral in effect, or in the case of sub-Saharan Africa where central taxation barely touches rural communities, cross-subsidization of communities and individuals becomes the practical equity issue. Miller (1989) applied the cross-subsidy criterion to a study of effects on equity of user fees for preventive and curative care in Benin, where fees for curative services were used to finance preventive services. She found that vertical equity was possible to achieve without discriminatory pricing, but only if the lower group made relatively more use of preventive services than the higher group.

Birdsall (1986) proposed that even if reducing subsidies means excluding some of the needy, user fees produce greater equity by allowing an expansion of the system as a whole, particularly those parts which are likely to serve large numbers of the poor. Mwabu and Mwangi (1986) found in Kenya that lower income households would gain proportionally more than higher income households if fees were charged and used to improve quality of services, provided the poorest households were exempted from fees. According to Shepard et al (1987), charging fees for drugs would also create equity between facilities that do and do not have drugs regularly available, and among patients who may or may not find needed drugs in stock. But the inherent inequity of having the sick, who are likely to be very willing to pay but also the least able, support the cost of a fee-for-service system was discussed by Brudon-Jakobowicz (1989).

2.9 Pricing and Exemptions: Experiences with Cost Recovery

Despite conflicting evidence about the equity effects of user charges, by the end of the 1980's the World Bank's theorists and USAID and UNICEF field officers were reassuring policy makers in developing countries, advising them to proceed, but cautiously, with user charges:

"The effects of price, income, and quality yield theoretical results that are unequivocally positive, if the improved quality causes outward shifts of the demand curve that are greater than the possibly lower income and higher price effects. (Birdsall 1987)

"User charges have a potential contribution to improving the financial base of the health sector. They also deter those people whose health needs are the greatest. Carefully discriminating fee systems are therefore necessary to ensure that revenue is provided only by those who can afford to pay, and that resulting income improves the quality and accessibility of health care targeted at the poor. (Creese 1990)

Undeterred by pleas that not enough was known about the specific effects of user charges, especially on equity (Gilsons 1988), and despite evidence that the maximum proportion of costs generated by cost recovery in sub-Saharan African countries to date was only 12% (Vogel 1989) and was unlikely to exceed 20 to 25% in the next decades (Russell and Reynolds 1985; Hoare and Mills 1986), donor agencies and national governments proceeded to experiment with user charges. It was argued that equity could be achieved through discriminatory pricing, and revenue levels such as the 10% to 22% potential estimated for Kenya by Ellis (1987) were considered by some governments to be significant for their revenue value alone. By the late 1980's, many of these experiences had been documented, leading to tentative general principles of pricing, e.g., as outlined by Ellis:

1. Fees should be consistent with patients' ability to pay, and should maintain access to health care.
2. Fees should direct health care utilization in appropriate directions, i.e., away from inpatient treatment when outpatient treatment would be adequate.
3. The revenue from fees should be used to improve the quality of health services provided.
4. No fees should be charged for services with strong 'public good' characteristics.
5. Limits should be placed on total out-of-pocket expenses for patients.
6. A system of forgiving fees from those absolutely unable to pay them should be established.

2.10 Pricing

There has been general agreement on the criteria for types of health services to price, including social objectives and alternatives for

treatment in the private sector. Services most suitable are general outpatient services for ill patients at clinic and village level, inpatient services, urban water supply, and drug sales to individuals (except for preventive care). This latter group of services accounts for the largest share of total health expenditure, amounting to 50-80% in many countries (de Ferranti 1985).

Most analysts agreed that it is irrational and inefficient not to begin recovering costs in urban areas. For example Stevens (1984) argued that in Kenya most rural health services are 'public goods', that even for curative care there is low ability and willingness to pay, and that high administrative costs would make it not worth the trouble. In Thailand, of those defined as poor by the official criterion, 84% lived in rural areas, or 93% in the case of those falling into the category of absolute poverty (Mills 1991). Bennett (1989) criticized starting cost recovery for drugs at community level while mid-level and tertiary level care remain free, but Creese (1990) questioned if it is realistic in poor countries to expect a transfer away of revenue collected from the hospitals which yield the bulk of the income, for quality improvements to the PHC system.

2.10.1 Prepayment

Abel-Smith (1989) found that all proposed fee-for-service schedules in Kenya would be unaffordable to much of the population, and suggested that prepayment by as many as possible would be preferable to trying to find a way of exempting the poor once illness had already struck. Some evidence of acceptability of prepayment in sub-Saharan Africa does exist: a majority of urban and rural dwellers in Niger expressed willingness to make annual payments for health (Tulane 1987), and actual systems have been implemented in Guinea-Bissau (Chabot 1989), and in Zaire (Carrin 1988).

2.10.2 Fees for preventive and ancillary services

Descriptions of efforts to apply cost recovery to non-curative services are rare, but an exception to the conventional wisdom that there is willingness to pay only for curative care comes from Zaire where Vian (1989) found that price did not influence enrollment in a well-baby programme. Bekele and Lewis (1986) compared cost recovery in several innovative trials in the Sudan. Quasi-public pharmacies, hospital visitor

charges, more convenient or luxurious hospital and clinic services, taxes on bus and cinema tickets, and improvements in hospital management, all generated more revenue than their costs and did not adversely affect utilization. Food cost containment generated the greatest revenue, followed by hospital visitor fees and a bus fare surcharge. Foster (1988) estimated the potential savings from improved management of drug supplies to be a large percentage of the cost of the drugs, emphasizing that such cost containment measures must be implemented before user fees. These examples illustrate the potential for achieving higher rates of cost recovery without necessarily burdening the poor and the sick.

2.11 Pricing objectives and rules

Pricing health services for cost-recovery has usually been done either by pricing to recover the cost of providing certain components of the service, or by guessing at a price level the community could support. As explained in Chapter 1, the information needed in order to apply any more sophisticated methods of establishing prices is rarely available. While a two-part tariff comprising a fixed annual charge and a marginal price per unit of service purchased (as required under most insurance schemes) is widely held to offer the potential for balancing equity and efficiency (Feldstein 1972), only fee-for-service pricing is reviewed here because of its predominance in PHC in sub-Saharan Africa at present.

Vogel (1989) described pricing strategies in the context of their effect on social welfare through their relative efficiency. In contrast to the socially inefficient alternatives of adjusting supply to maximize profits, to just break even, or to encourage consumption by overproduction, the socially and economically efficient supply level occurs when marginal cost of production equals average revenues, or price. This equates society's marginal valuation with marginal costs and a profit is generated which could be used to subsidize a pure public health good.

The practical value of cost-based pricing was questioned by Musgrove (1986a), who observed that pricing generally does not determine supply in most public cost-recovery schemes, i.e., that fees are collected for the sake of generating revenue rather than to establish an optimally efficient

equilibrium point. The price should take into account only the government's welfare function, which may include maximizing consultations as well as revenues. Maximizing this function subject to a budget constraint that includes the revenues generated requires that the price be set so the demand is inelastic. Concern only with revenue would require price elasticity to be set at -1, but equity concerns bring the optimal elasticity closer to zero and lowers the optimum price. Griffin (1987) argued that a detailed understanding of costs is not a prerequisite for setting user charges: For private sellers, price setting is an iterative process in which costs merely represent the lowest point to which prices can be allowed to fall. Since governments have no intention of covering costs initially, there is no reason to be preoccupied with costs when getting started. Prices need not be exactly correct from the outset, and where services were previously free, almost any fee recovered will make a large difference in revenues.

An optimal price schedule for all consumers would take account of income distribution, but in a further stage of development would also consider the possibility of obtaining more revenue through price discrimination from those having higher incomes, with most costs being recovered from the majority of patients who are neither rich nor poor (Vogel 1989). Musgrove (1986a) recommended fee discrimination in favour of those consumers for whom non-price costs are already highest, on a collective rather than an individual basis to reduce administrative costs. Fees should be lower in rural areas of widely dispersed population and higher in areas with good transport and relatively easy access, but bypass fees should be charged to reinforce the referral system. Gertler and van de Gaag (1988) suggested that the regressive effects of introducing user fees can be avoided by setting fees at clinics in poorer villages at different levels than in richer villages.

The theoretical analysis has been extended to the actual situation in many countries, i.e., where there are initial government subsidies but there may not be excess demand at zero price due to low quality. If fees are charged and quality is improved, demand for the services will increase and there will be an increase in visits over that demanded at zero price, for a net social gain. The conditions under which this can happen are that

elasticity of demand with respect to quality is positive and exceeds the negative price elasticity, and that marginal costs after improving quality do not increase more than the total revenues generated by increasing user fees. This was shown by Birdsall (1987) and Jiminez (1987), and is one of the theoretical underpinnings of the World Bank's policy. The practicality of this principle was questioned by Gilson (1988), who noted that some governments have not demonstrated commitment to the idea of retaining fees at the facility level. Creese (1990) found no large-scale experiences to date of fees having been used to improve the quality and accessibility of services in a way that would compensate for the regressive effects of charges, and Vogel (1989) doubted whether the 25% of revenue retained by facilities in Ghana is a strong enough incentive to improve quality.

2.11.1 Variations on fee-for-service

Makinen and Block (1986) found the option of prepayment too administratively complex for community-level PHC in Guinea, especially if co-payments were employed to increase efficiency. They detailed a hierarchy of practical options for pricing in a typical fee-for-service PHC cost-recovery system: The primary choice is payment per visit versus payment per episode. Next, for either choice it is possible to have separate or combined charges for consultation and medicine, involving tradeoffs between risk-sharing, overuse of some services, and complexity. For any of the preceding combinations, there is a further choice of simple or complex fee schedules, i.e., based on the actual cost of treatment or a flat rate, all of which entail further tradeoffs.

2.11.2 Exemptions and sliding scales

One of the objections raised to user charges is the practical difficulty of identifying those who truly cannot pay. Experiences from cost-recovery programmes illustrate different approaches to this problem.

There is a general tendency to place a low estimate on the number of indigents, on the assumption that the poor in many instances can find the required money in an emergency. In a revolving fund in Nepal only 5% of patients made use of the Sick Fund for the poor (MSH 1988). In a community financing scheme in rural Brazil a sliding scale was established and allowances were made for those unable to pay, and postponement of payments

was allowed if a client did not qualify for an exemption. Only 0.4% of visits involved reductions or exemptions, but debts were not repaid for 6.5% of visits, suggesting that this was closer to the exemption level that should have been allowed (PRICOR 1987). In Mali exemptions for up to 15% of consultations were allowed for indigents, children, and 'social illnesses' (Medicins Sans Frontieres 1988). An opposite philosophy was expressed in Kasongo (Zaire), where equal payments by all were seen as necessary to promote solidarity (Gilson 1991).

In the Gambia, it was noted that the appropriate standard of poverty is difficult to assess because it is not the earning power of the individual that is the issue, but their access to money in the extended family environment (CIPFA 1986). In Ghana no exemptions were made for the poor since the extended family is expected to help out when necessary (Waddington and Enyimayew 1989). Allowances for exemptions may have to vary with price level and with season. In Kenya Huber et al (1989) found few cases of inability to pay outpatient charges, but recommended nonetheless that allowance should be made for households who cannot always pay because their income fluctuates, or where there are many episodes of illness or very costly treatments are required for certain acute and chronic conditions. Abel-Smith (1989) warned that high hospital fees in Kenya would either further impoverish the poor or would be uncollectible, and recommended setting the level for medical indigence higher than the official poverty level. In Zimbabwe, where the income level at which charges begin is set rather high (Z\$150 monthly), the impact of user fees on the community is said to be minor (WHO 1988c).

Where the solidarity of the extended family or the community for aiding the poor cannot be assumed, either formal or informal exemption mechanisms may be used. Huber (1989) proposed a formal system of exemptions in Kenya which required gathering information on patient age and sex, household composition, residence, number of children in school (indicating ability to pay), education, occupation, appearance and dress, and recent health expenditures. But Abel-Smith (1989) noted that identification of the poor in Kenya is difficult because of household composition, lack of farm accounts, prevalence of subsistence agriculture and informal trading, and seasonal factors, and recommended instead keeping

fees low overall to minimize time-consuming means-testing of patients claiming inability to pay. But a wide window for exemptions does not guarantee that they will be used. Takeup of formal exemptions in Nigeria was low because many people were unaware of them or intimidated by the processes involved (Orubuloye et al 1991). In Thailand, although the official poverty criterion for exemptions included nearly 70% of rural households, the actual take-up of free care was under 40%, which was nearer the level of officially defined absolute poverty (Mills 1991). Exemption on the basis of indigence is more often determined informally by village health committees that know the entire community, as in Mali, Senegal, Benin, Ghana, and Zaire (Mandl and Ofosu-Amaah 1988).

There is a tendency for exemptions to grow out of control once established. In addition to those certified as indigent, exempt categories may include those with specific infectious diseases and those with presumed low ATP such as widows, students, the blind, or soldiers. Rarely are efforts made to recover these exemptions from a sponsoring organization, such as the military or the education ministry (Griffin 1987). In some projects health personnel have also been exempted (Mandl and Ofosu-Amaah 1988). Hospitals in the Dominican Republic either reduced or waived fees for up to half their patients (Bitran 1988a). Exemption schemes can be manipulated by the wealthy, often at a cost to the poor; in Gujarat, India wealthy merchants and landholders found ways of concealing their assets to qualify for subsidies in a rural bio-gas project (personal communication).

Since measuring incomes is difficult, proxies such as geographical location could be used to implement a sliding scale policy. For Kenya, low fees were recommended in rural areas, moderate fees in urban areas, and the highest fees in the wealthiest city, Nairobi. Transportation costs would offset the incentive to travel to avoid high fees (Ellis 1987). CIPFA (1986) observed that while price differentiation between rural and urban areas is correct in principle, it can be inappropriate because urban poverty can be as acute as rural, and because of the lack of lower-level care alternatives in the urban areas of the Gambia. Abel-Smith (1989) suggested that fees in Kenya should be adjusted by average income level of the province or district, or if this is unacceptable, according to the average income of the poorest. He commented that this would require

knowledge of factors related to ability to pay specific amounts, including the degree of hardship caused to poor patients who were not excused from fees. Cross-subsidization among health centres has met with occasional resistance from communities, but has been shown to be feasible in Mali, where revenues were remitted to the district level (Mandl and Ofosu-Amaah 1988). Brenzel (1987) found that price discrimination by geographical area was accomplished de facto in Zaire, with fees set by local committees, and many of the more successful community financing schemes were characterized by cross-subsidization of services (preventive by curative) and of communities (poorer by richer). Berman et al (1987) noted that it is difficult to measure income for rural agricultural households, and Good et al (1979) emphasized that in rural areas it is necessary to account for non-cash income, which may not show up in income calculations but may free up cash income to be spent for medical care. Socio-professional differentiation based on occupation, land ownership, or other factors, is a more realistic option than using income, although it is also difficult to differentiate between rich and poor farmers (UNICEF 1989b).

2.12 Affordability

Most of the work cited to this point has looked at the problem of user fees from the perspective of the supplier: it deals with such problems as the extent to which demand might decrease when fees are introduced or raised, and how to establish fees which will maximize the suppliers' utility function of generating revenues and improving welfare. An uncomfortable vacuum has been left where knowledge about the effects of user charges on individual consumers is concerned.

Perhaps because of the complexity of household economics, there have been few attempts to clarify what is meant by an affordable expenditure. A survey of living costs in urban areas of Kenya found a monthly food requirement for an average family of KSh 600, and a median income of KSh 700, and concluded that 70% of families could not afford both adequate nutrition and the loan repayments for a proposed housing scheme, and that many urban families sacrificed diet in order to meet other unavoidable expenses (England and Alnwick 1982). Abel-Smith (1989) observed in Kenya that the actual access price of medical treatment was of little importance

as far as utilization was concerned because Kenyans will find whatever fee they are expected to pay in addition to transport costs, but the risk of generating real hardship was great. Wang'ombe (1984) calculated costs of a visit to a rural Kenyan health centre as KSh 20, inclusive of travel, time, and drugs. Neglecting rural/urban differences, this makes the cost of a PHC visit only 3% of monthly income, and perhaps 4% to 5% of monthly food expenses, but whether this should be considered a hardship cannot be judged without knowledge of many other factors. The question of ability to pay is further complicated by the fact that health expenditures differ from other household expenditures by their high variance across households and across time for a given household. Over et al (1991) found in developing countries that most households spend only a small proportion of their income on medical care, while a small number of households spend a great deal. Conflicting anecdotal evidence exists as to the hardship effect of medical expenditures, with the magnitude of the costs involved apparently a key variable. In Thailand, 60% of involuntary land sales were said to be due to high medical bills (Abel-Smith 1987). On the other hand, when costs are moderate they are apparently tolerated: in Burma households indicated no regret over having to resort to austerity measures for several months because of contributing about a quarter of their monthly income to a latrine construction scheme (Abel-Smith and Dua 1988).

There is no accepted definition in economics of an affordable price; advertisers and politicians speak comfortably of 'an affordable car', or 'affordable housing', but this usually refers only to a product that is cheaper than most others on the market. A distinction between absolute and relative affordability was made by McPake et al (1992), with the former being judged in comparison to total income or expenditures, while the latter is based on comparisons with alternatives to government services such as private practitioners, pharmacies, or drug sellers.

Some attempts have been made to take affordability into account when pricing health services. One approach has been to look at how much people are already paying for health care or drugs, or other measurable expenditures. Another is to determine a reasonable percentage of annual income which could be spared to cover health costs. Some examples of expenditure-based affordability criteria are:

- 1) In Bangladesh the lowest fees were charged to individuals who could not afford two meals a day throughout the year (Blakney et al 1989b).
- 2) The annual premium for membership in health posts in Lalitpur, Nepal was set at the price of one cigarette per month, which managers believed households could easily forego in order to purchase health insurance (Roth 1987).
- 3) In Guinea financial participation for health care should not exceed 2% of "family resources", corresponding to a calculated minimum income (UNICEF 1989b).
- 4) In the U.K. a proposal for NHS prescription charges included an annual prepayment of 1% of mean income of the lowest 2% of wage-earners (Green 1985).
- 5) In Brazil, fees were set at a level above costs but below competing private sector prices (PRICOR 1987).
- 6) In Thailand, prepayment for 8 illness episodes was judged affordable by rural households because it cost one-sixth the mean annual expenditure on drugs and medical care (Myers et al 1987).

Income-based definitions of affordability include de Ferranti's (1985) suggestion that the fee for out-patient services might be determined in relation to the daily agricultural wage, which Shepard and Benjamin (1988) showed adjusts for differences in ability to pay between countries. They believed it represented a "reasonable" level of fee, and demonstrated that each adult would have to work 2 to 4 days per year to pay for the typical family's health care if the charge per outpatient visit were a day's wages. But Blakney et al (1989b) noted that while agricultural wages are determined locally, drug costs are determined by international price levels, so their recovery may therefore be difficult in the poorest countries. In addition, the US\$0.50 to \$0.75 cost estimated for average treatment cost for essential drug programmes assumes a level of efficiency in the drug supply system which often does not exist: a survey by Waddington (1989) of 9 drug revolving funds in sub-Saharan Africa found the treatment price for an adult malaria patient averaged \$0.79, and \$1.82 for a child with bronchitis. Average malaria treatment cost the equivalent of 84% of a watchman's daily wages. An unaffordable level of expenditure on drugs is implied by behaviour such as not buying all prescribed items, or resorting to markets where the price of drugs is lower and negotiable (WHO/DAP 1991b).

The effect of multiple illnesses on affordability is often not considered in a fee-per-episode scheme. The importance of this interaction was shown by Bitran (1988b), who calculated that a child who gets 3 illness episodes during the year may spend up to 30% of the annual household income available for that child. In rural Haiti, Coreil (1983) suggested that exemptions are most needed by households with more than 5 or 6 children and only one or two adults. Equity in favour of the more seriously ill is enhanced by not charging for repeat visits in Botswana, or by charging half price in Senagal's Sine Saloum project (Stinson 1982).

2.13 The Special Case of Revolving Drug Funds

Drugs accounted for 86% of all health expenditures in 19 African countries (Piachaud 1980), and there is a correlation between low per capita incomes, low health expenditures, and low per capita expenditures on drugs (WHO 1988b). Better selection of drugs and more effective forms of competitive purchasing, coupled with better internal management, have reduced the burden of cost to governments significantly but health ministries in many developing countries still have difficulty meeting the demand (WHO 1988c). Because simple essential drugs are used at the PHC level, the costs of adequate supplies are lower than at other levels of health services: average drug costs per treatment episode for 7 African and 3 Asian countries was \$0.14 at the village level, rising to \$0.66 at hospitals (WHO 1988c). But although costs per capita are low, total costs are high because of the large number of cases seen at PHC level. In developing countries, the critical role that curative care plays in establishing the credibility of PHC (Gray 1982), and the link to reliable, adequately funded drug supply, has tended to focus the attention and efforts of planners and managers on the financing of drug supplies.

User-charge schemes which attempt to recover the cost of providing essential drugs represent the most commonly attempted form of cost-recovery at community level health facilities (Stinson 1982). According to Carrin (1987), there is no a priori reason for channeling private expenditures towards the financing of drug supplies rather than other services, but the large share of drug expenditures in government health budgets means that patients' contributions can set free an important part of the budget for

development of the health infrastructure and expanded services. It is also claimed that charges to cover the cost of drugs in public facilities might reduce overall household spending on drugs: if revenues were used to make drugs more available in public facilities, clients would be spared the higher costs of private pharmacists, and competition with private pharmacies would eventually drive down the high profits derived from their being near monopoly suppliers (World Bank 1987).

While not yet regarded as a panacea and certainly not without their critics, drug revolving funds are being established in many countries of sub-Saharan Africa. The following statement is perhaps typical of the rationale and means proposed to solve the drug financing problem:

"The deteriorating economic situation in Nigeria has hit the health system... extremely hard as funds are not available as they were some years ago. ... very few drugs and other materials needed to provide basic health care have been available in recent years from State Government funds. The lack of drugs at the dispensary level makes it impossible to use these facilities as cornerstones in an efficient health care system. An efficient drug delivery programme is therefore an essential part of a revitalization and strengthening of the existing health care system ...together with introduction of mechanisms to deal with serious constraints in the financing of such drugs. One of the adjustments which has been proposed... is the establishment of an essential drug programme and a drug revolving fund. (Moore et al 1986)

The high willingness to pay for drugs has influenced policy in many countries. Koita and Brunet-Jailly (1988) recommended charging for drugs in Mali because such a scheme could maintain prices at the level currently charged by the Peoples' Pharmacies, which was considered sustainable since 'only' 5% of household income was currently spent on modern drugs. In Rwanda, selling drugs at government centres was preferred to raising consultation fees. A survey found that people were willing to accept higher user fees if these would assure availability of drugs. Tying fees to drugs would also facilitate retaining revenues locally and earmarking their use for drug supply (Shepard et al 1987).

Pricing for sustainability, as opposed to limiting deterrence of potential users, has been emphasized in advice to governments. Cross et al (1986) described how the financial success of a revolving fund depends

on the interrelated price or markup schedule, cost-recovery objectives, and allowed exemptions. Price-setting and exemptions policy were identified as the problems most crucial to the survival of community drug-sales schemes by Foster and Drager (1988). If prices are set above people's ability to pay, the scheme will fail; if set too low, costs will not be fully recovered. MSH (1988) noted that a revolving drug fund must have a cost-recovery target, which may range from only part of the cost of drugs to full costs of PHC, but public health and equity objectives may make the goal of complete financial self-sufficiency unrealistic. The feasibility and sustainability of pharmaceutical cost recovery depends on community acceptance of the need for cost recovery and user fees and assistance with oversight and accountability, adequacy and distribution of real household income, and protection of target populations without extending exemptions to the point where economic viability is threatened (Blakney et al 1989a).

The objectives of affordability and sustainability are sometimes in conflict in cost-recovery schemes. Gray (1986) reported that in an effort to keep prices low, two early schemes in Mali initially added 15% to the cost of drugs, but failed because this was insufficient to run the distribution system and provide incentives. Cross et al (1986) discussed alternative pricing strategies: 1) using the cost of the drugs and the overheads of the delivery system and 'pipeline', 2) using willingness to pay, based on 'expert opinion', and 3) test pricing to see what level is actually possible. Having calculated that a markup of 200% over supplier FOB prices may be necessary to make a revolving fund work, they noted that with bulk procurement of selected generic drugs the selling price may still be below private sector alternatives. A rough estimate was made by Foster and Drager (1988) that a 115% markup is required to sustain a revolving fund, while Waddington and Panza (1991) mention that a starting point of 35-45% markup is often appropriate. In Benin the markup of three times the drug cost was determined from the total costs of operating the system, including subsidizing the cost of preventive services but excluding salary costs. This lack of agreement on the markup needed for sustainability implies that there is often room for improving efficiency so that lower prices can be maintained.

2.13.1 Efficiency and complexity in drug pricing

There are several options for drug pricing in addition to the general pricing choices reviewed earlier. A system in which the fee per treatment reflects the actual cost of drugs would provide advantages in terms of cost-consciousness and inclination towards proper prescribing habits and the most cost-effective treatments (Moore et al 1986). Foster and Drager (1988) preferred a flat fee per drug to a flat fee per prescription to hold down costs, and a price-band system for drug prices as a compromise between ability to achieve full cost recovery and ease of administration. CIPFA (1986) recommended a pricing policy of one standard charge per prescription for the sake of simplicity, and so the patient will always know what payment will be expected. Guinea chose a system of fee per complete treatment, with the fee based on the actual cost of drugs used in the treatment (Knippenberg et al 1990). Advantages claimed for this approach include lower leakages compared with a fixed consultation price because of the linkage between revenue and the quantity of drugs used, the proportionality of revenues and utilization, and the effect of encouraging patients to finish their treatment.

Economic efficiency requires the greatest markups on drugs that have low price elasticity, but from a social welfare point of view markups should be higher on drugs consumed by non-poor households. Combining the two criteria, there would ideally be a sliding scale based on income as well as differential pricing based on elasticities (Carrin 1987). Because price discrimination for individuals can be difficult to implement, Litvack et al (1988) suggested the alternative of considering both drug necessity and cost in setting prices of individual drugs. A course of treatment which is both vital and expensive would be sold below cost, while less essential or palliative drugs which are cheap would be marked up. This approach can enhance equity by lowering the burden of necessary treatments to the poor while offering the choice of higher-priced treatments to those who can afford them, and has been applied in community drug sales schemes in Ghana and Benin (Mandl and Ofosu-Amaah 1988). However, Brudon-Jacobowicz (1989) argued that where markups on less essential drugs are used to subsidize more expensive treatments, there is a risk of promoting unnecessary demand for drugs, especially expensive ones, in order to recover costs.

2.14 The debate over the Bamako Initiative

Scant and conflicting data on the risks inherent in cost recovery, particularly with regard to protection of the poor and the need for management skills, may have set the stage for the debate over the Bamako Initiative, a UNICEF/WHO programme that has attracted much attention since its inception. Based on examples of better utilization and functioning of services achieved in several African countries by improving the availability of basic drugs and supplies to communities, with management at the district level, a plan for self-sustaining, decentralized PHC in sub-Saharan Africa was introduced at the September 1987 Meeting of African Health Ministers by UNICEF. Named after the city in which the meeting was held, the plan was initially described as "a joint WHO/UNICEF response for establishing self-sustaining drug retail projects, the profits of which will help finance PHC" (WHO/AFRO 1988a). It called for a consortium of donors to provide funding to sub-Saharan Africa member states, for basic equipment for PHC services, provision of basic drugs as seed stock for revolving funds for the period of the programme, and support costs. Fees received for drugs were to cover operational costs, including salaries and the replenishment of drugs and supplies for MCH and PHC programmes. Community health committees would be strengthened or created where necessary to provide guidance for local health activities, and management of national programmes would be decentralized to district level.

The first guidelines for implementation (WHO/AFRO 1988b) emphasized that measures for ensuring access for the poor were necessary, possibly through fee exemptions or subsidies for which criteria should be worked out with the community. It warned that the markup on drugs might need to be increased a further 20% to 30% to cover community members who might be unable to pay the full amount charged.

Criticism of Bamako Initiative policies originated with European private organizations involved in health care in Africa, with their concerns being transmitted to donor agencies in their countries. Concern about rational drug use was an initial focus of criticism, specifically that drugs and financing not be overemphasized at the expense of the other elements of PHC strategy. Questions were also raised about equity and the

scarcity of management resources (HAI 1989). UNICEF came under attack for supplying an ingredient of "adjustment with a human face" which would "appease critics, not threaten the existing order, and protect the minimum needs of the poorest" (Kanji 1990). The critics made four main claims: that charging for drugs would inevitably burden further the vulnerable because of the high markups needed to sustain PHC; that fee systems place unrealistic management and logistical demands on developing countries; that true self-sufficiency is unachievable because of the shortage of convertible currency in sub-Saharan African countries; and that charging for drugs would create perverse provider incentives which encourage irrational prescribing and an emphasis on curative activities. Chabot (1988) faulted the Initiative for not specifying how communities would control and use the revenues generated, and suggested that the effort might weaken efforts to become self-reliant because of increased dependence on external donors and the pharmaceutical industry. Garner (1989) asked that other sources of funding besides fee-for-service such as risk sharing, insurance schemes, or taxation be considered, noting that ability to pay is largely an unknown area, and identification of the poor presents problems. Corbett (1989) concluded that the poor are likely to become more impoverished if it takes longer to improve preventive measures to reduce their physical vulnerability than it takes to introduce charges for curative care. Equity of access was a concern of the sponsoring agencies, but some countries "seem reluctant to tackle the question of indigents... they argue that enough protection exists through extended families, traditional mechanisms and community organizations, to cover costs for the neediest people." The percentage of indigents was said to be only 1-2% of the population and "they always seem to be taken care of by traditional mutual help systems in the rural areas" (UNICEF 1989a).

To deflect criticism, UNICEF began to emphasize the role the Initiative would play in the development of community-level efforts and self-reliance in PHC, and the potential for a longer term development strategy with a strong human and social element (Ofosu-Amaah 1989). In the absence of any empirical confirmation that the poor had been adequately protected in existing cost-recovery schemes and that management and foreign currency requirements could be dealt with, the proponents called upon the idea of relative affordability, asking what the effect on the population

(especially the poor) would be in the absence of any effort to mitigate the lack of essential drugs and poorly supported public services. Examples from Liberia and Nigeria were put forward where, while charging for drugs caused an initial drop in utilization, the unavailability of drugs had had a far greater effect on patient attendance (Blakney et al 1989b). Knippenberg et al (1990) observed that before the implementation of the Initiative in Benin and Guinea the population resorted to private pharmacies, where expenditures on a single illness episode averaged over US\$10, or to local markets where drugs of dubious quality were sold without control, and the amounts spent were not reinvested to improve the health system. Provision of curative services was in fact to be emphasized, as a means of building community support and to encourage mothers to have their children vaccinated during curative visits (Diallo 1991).

For some countries there was no problem of ill-focussed objectives or policy conflicts. Kenya saw the improved supply of basic drugs and the possibility of incentives obtained through the sale of drugs as the key to making their community health worker scheme function better (Maneno 1990). There, the issues of protection of the poor had already been examined in a lengthy policy debate over cost-sharing for social services. In Sierra Leone, an essential drugs programme relying on reimbursible procurement through UNICEF had been under development since 1986, and there was political commitment to achieve universal coverage of PHC (UNICEF 1989b), so the Bamako Initiative was embraced by a government that lacked the resources to do anything else.

Summary

This first section of this chapter reviewed the literature on effects of the global economic downturn of the 1970's and 1980's on the economies of sub-Saharan Africa. These problems and the attempted macroeconomic solutions resulted in reductions in spending on government health services. The poor were also especially affected by the elimination of subsidies which raised the price of their basic needs. Increased private financing of health care was proposed as a solution by international donor agencies, with the call for user charges supported by studies that showed high demand for health care. These are seen by some as beneficial, conferring net benefits and potential distributional improvements. Others believe user charges reduce equity and the utilization of services.

Empirical studies of the demand for health care, reviewed in the second section, tend to confirm the price and income effects predicted by classical theory, but estimates of elasticities vary widely. On close scrutiny, much of this evidence is inconclusive, and estimates of the lower economic groups' ability to pay seems especially subject to different interpretations of the available data. It is likely that the interaction of the price level with quality and other factors affects the results to a degree that no general conclusions can be reached about the effects of prices on the utilization of PHC services in a given environment. Other efforts to assess the effect of user charges agree on a high overall degree of willingness and ability to pay in a given community, but also that there is also a sizable minority that has little ability to pay. Longitudinal studies suggest that communities can adapt best to gradual, moderate price increases. The evolution of commonly applied rules for pricing was reviewed, showing consensus on which services should be priced and on how complexity of pricing affects efficiency. The concept of equity is subjective but there is general agreement that access to services by the poor can and should be protected by means of discriminatory pricing and exemptions. Pricing rules have been formulated, but they are often applied in highly modified form, according to guesswork and pragmatic demands, reinforcing the need for a more rational approach to setting price and exemption policy. Modifying these pricing rules to incorporate equity goals has proved less straightforward, with little agreement as to the best way to protect the poor and establish affordable prices.

Revolving drug funds are the most common user charge scheme at PHC level, and offer unique possibilities for pricing to improve equity of access, but ultimately the problem of managing exemptions remains an obstacle to protection of the poor. The Bamako Initiative, a plan to use cost recovery for essential drugs as a source of revenue and a focus of community effort for development of PHC, has adopted a policy of decentralized decision-making, and has identified the need for a framework for making decisions about pricing and exemptions.

Chapter 3:

Review of Previous Work

Part B: The Rural Subsistence Economy: Coping with Poverty and Illness

3.0 Introduction

That ill people are generally willing to pay for treatment is clear. The poor are also often able to pay, as shown by utilization of health facilities which require payment, but there is little information on what effect these payments have on overall household welfare, especially for the economically vulnerable classes. Each individual decision to seek treatment is the result of a comparison of the utility anticipated from the treatment, and the cost of the time, money, and other resources expended to obtain it; the 'rational consumer' chooses a treatment which results in a positive net benefit. To assess the impact of user charges and to clarify the concepts of affordability and protection of the vulnerable would require full knowledge of the benefits derived from the treatment bought and the welfare costs of payment, but measurement of benefits of primary health care (Mills and Thomas 1984) is a difficult task and is in any case beyond the scope of this thesis.

Given the trend towards decentralisation of managing PHC, it is becoming less likely that price-setting will be done only at the national level. There are important economic differences between local areas in most countries, as for example in the Sahel, where the population extends from relatively prosperous river basins through semi-arid pastoral lands. A system of district or lower-level price-setting is needed which can take into account the relative purchasing power of the local population and the deterrent effect of a range of prices. The preceding review of the effects of user charges on equity pointed to the need for additional research on affordability and protection of the poor. This chapter describes certain characteristics of rural subsistence economies as a context to interpret differences between households and between communities.

3.1 Poverty Levels

Identifying and counting the poor has long been a preoccupation of Western society. Its relevance to the field of development is largely due to the suspicion that economic growth by itself may not solve or even alleviate the problem of widespread poverty in less developed countries (Chenery et al 1974). Measures of absolute poverty and of inequality, while related, differ in their significance. Relative inequality identifies the proportion of people who might have difficulty paying a price that the 'average' person could afford, but it tells little about the extent of absolute poverty, which can be measured by comparing absolute levels of income or consumption with "minimum levels" somehow defined. Chenery et al cautioned that income measures must include all forms of "permanent income" including in-kind income, and that rural income levels are typically understated. Extending the definition of income to include nonmarket sources tends to reduce apparent inequality (Kusnic and DaVanzo 1982).

3.1.1 Poverty and Nutrition

In developing countries the most practical and frequently used measure of absolute poverty has been based on food, calculating the minimum expenditure necessary to attain a minimum nutritional intake, and multiplying by the average ratio of total expenditures to food expenditures for the population as a whole to estimate a minimum total income. Technical objections to definition of poverty lines and the limitations to measurement of incomes in industrial countries have been described by Barr (1987) among others. He cited difficulties with all attempts to construct an objective poverty line, including using the consumption of a specific bundle of goods, using total household expenditure, and using total money income as indicators. In particular, attempts to define a minimum level based on nutritional requirements is subject to the normal variances between individuals, and it is also unreasonable to expect people to fill those requirements at minimum cost.

Seeking absolute poverty measures, rather than such relative criteria as 'earning less than 1/3 of average national GNP per person', Lipton (1988) justified the view that 'adequate dietary energy' best summarizes

the essence of the basic needs approach, defining an 'ultra-poverty' line as the expenditure level where the spending pattern on foods and non-foods for the average household with a given size and age and sex composition makes it just possible to meet the energy requirements for work and health and to maintain full mental and physical functioning, including undiminished prospects of survival and wellness. Lipton found evidence that this requires at least the equivalent of 80% of the accepted specific nutritional requirement. A second and usually much higher "moderate poverty line" occurs at a level of expenditure where a household can just avoid taking financial decisions that imply physical or human disinvestment, i.e., sale or mortgage of physical or financial assets, or reduction of outlay or time devoted to acquiring educational capital. Although Bryceson (1989) noted that it is far from accepted that 80% of the accepted nutritional requirement is sufficient for maintenance of health, these definitions are potentially useful in the identification of the vulnerable. Lipton (1988) also found evidence of a discontinuity in behaviour at the ultra-poverty level, which can serve to identify the ultra-poor. They are in households that spend 70-80% of total outlay on food, but still meet less than 80% of the suggested dietary energy requirements. When more money is available, it is spent first on more starchy staples. This definition of the ultra-poor includes 10-15% of households in low-income countries, containing 15-20% of populations, and 17-25% of pre-schoolers.

3.1.2 Smallholders and Rural Poverty

In most developing countries a characteristic of poverty groups is lack of ownership of productive assets (primarily agricultural land), a critical constraint on the income of small farmers (Chenery et al 1974). Rapid population growth supports the dilution of capital assets, and low rates of savings perpetuate patterns of capital concentration (needed to raise incomes) over time. Hill (1977) found in rural northern Nigeria (where land is bought, sold, inherited, and lost) that household wealth is associated with age due to the cumulative opportunities for acquiring wealth, and especially with the size of farm-holdings. Older household heads were also less dependent on obtaining loans and were more likely to receive gifts when needed to make up cash deficits. Inter-household differences could also be attributed to the size and composition of the

household. Hill found that, barring disasters, a household could gradually accumulate wealth in the form of land brought under cultivation provided there were enough able workers. Extreme poverty does not affect whole communities, but individual conjugal or extended families, or (much less frequently) isolated individuals. The poorest were characterized by a) owning small areas of farmland, obtaining lower yields per unit of effort; b) selling grain immediately after harvest when prices were lowest and having 'no time to farm' because their granaries were depleted so soon after harvest that they were obliged to do other, usually unremunerative, work; and c) having too little farmland to set their sons to work, they were considered poor risks and so could seldom borrow money. Bryceson (1989) observed however that most of sub-Saharan Africa is land-abundant relative to Asia and Latin America. While about 80% of the population lives in rural areas, population densities are low. Land allocation is largely controlled through tribal mechanisms based on the criterion of need as defined by family size, and land sales are rare except in cash cropping areas. Landlessness is relatively rare, and wage levels comparatively high because peasants are not dragged down by the degree of destitution seen in parts of Asia, for instance. Hired labour is relatively rare, with child and female labour far more important in peasant household economies.

Where markets are not yet prevalent and where land availability is not a constraint on production, households which are better off cannot exercise greater demand for food, and as there is an equal chance for harvest failure in isolated communities, this works against the emergence of differences in nutritional status (McLean 1984). But while the land scarcity of northern Nigeria described by Hill may not be typical of much of Africa, extreme poverty within communities can still result from households having too little labour to meet their food needs through farming, lack of access to capital, or other factors specific to the household such as pest damage, accidents or illness (especially chronic illness and infirmity due to age), and miscalculations of an interpersonal or micro-political character (Richards 1986). In addition, markets for grain and cash crops have assumed importance in many areas. Zaidi (1988) connected the monetization of the rural economy with worse nutritional status in Pakistan; as more channels are opened to urban markets, surplus products which normally would be consumed at home are sold off in the

cities, leaving less food for agricultural workers. Where farmers' food production is usually sufficient to cover their own needs, foodgrains are sold because after the harvest there is more food available than can be eaten and stored, and to exchange for processed foodstuffs and other necessities. While the purchase of consumer durables is relatively rare, even basically subsistence farmers require some cash. Bryceson (1989) noted that articles like soap, kerosene, cloth and cooking oil are fairly standard purchased items throughout the continent, and peasants would feel hard-pressed without them. She concluded that in areas with little cash economy the trade in subsistence grains reinforces rural class differentiation. Stephens (1988) observed in Liberia that subsistence farmers rarely had surpluses which could be sold to build up cash reserves, and that the sale of food crops is not always due to production of surplus stocks. Post-harvest distress sales and rainy season purchases at inflated prices define a cycle of impoverishment in which poor households must operate. In contrast, middle and rich farmers sell their surplus late in the season when prices are higher and buy far less grain during the year. Loans of grain and money to poor peasants are at high rates of interest. Where there are few cash crops or other opportunities to earn cash, it is not unusual for the food crop to be oversold to meet the household's purchasing needs (Bryceson 1989).

Variation in nutritional risk between countries is not generally attributable to per capita income differences: the level of acute malnutrition in Cote d'Ivoire and Kenya is higher than in Cameroon, Liberia and Sierra Leone, but it is also lower than in many non-African countries (Strauss 1988). This may be a consequence of food availability in subsistence areas: Sierra Leone had the highest per capita rice production in the West African rice zone (Richards 1986). While Hill concluded that extreme poverty does not often affect entire communities, there are factors which can cause some communities to be relatively poor; population pressure has reduced the availability of the most fertile land in Zaire, and the price offered to farmers by traders rapidly declines rapidly with distance from a market centre and the cost of transport (Cornell 1989). Young and Jasper (1992) were unable to show any significant intrahousehold differences in the nutritional status of children under famine conditions in Darfur, Sudan, and suggested that under these conditions all households are

below a critical threshold of access to food. They noted that no studies showing an association between household socio-economic status (SES) and malnutrition have been based on African data.

The evidence presented thus far describes much of sub-Saharan Africa as a place where food scarcity is not the rule, and where household-level subsistence is possible given enough available labour. With little government intervention in the subsistence sector, economic differentiation between households and communities arises for reasons more related to fortune and market forces rather than to social structure, as is the case elsewhere. Poorer farming households have difficulties balancing their food needs with their cash requirements.

3.2 Coping Strategies

Avoidance or management of hunger, ill-health, premature death, and loss of assets necessary to maintain existing living standards, is a universal priority. Corbett (1988) described three broad stages of responses used by farmers in sub-Saharan Africa to cope with food insecurity, 1) insurance mechanisms, e.g. changes in cropping patterns and planting practices, reduced consumption, and inter-household transfers, 2) disposal of productive assets, e.g., sale of land, agricultural tools, mortgaging of land or obtaining credit, and 3) destitution, e.g., distress migration and starvation. These mechanisms are of interest here since they could also result from economic stress due to having to pay for treatment when a household member falls ill.

In the Gambia farm households reduced consumption in the rainy season when food stocks were low and the harvest was yet to come. Other staples were substituted for the preferred rice and millet, and wild foods were gathered. In the case of serious food shortage and especially if the household was living on credit, meals were missed or the amount of food cooked reduced (Taal 1989). In Sierra Leone, early rice is planted as a hunger-breaker, and subsistence farmers use elaborate agronomic strategies to ensure against total crop failure. Cassava is substituted for the preferred rice, and wild foods are gathered in the rainy season (Richards 1986). In both countries, the cultivation of a collective household grain

plot in addition to individual fields increases food production. Mechanisms such as these suggest that households usually have the potential to adapt to a temporary need for more cash.

Similar behaviour was observed in Nepal by Nabarro et al (1989), where farmers coped with regular food deficits by reducing consumption of high energy foods during the months of shortage, selling agricultural and livestock products, making and selling crafts, seeking employment off their farms, borrowing food or cash from a moneylender, or leaving the household temporarily, thereby reducing the number of people who have to be fed. Their study suggested that there is a threshold of annual food shortage, in the vicinity of 3 to 6 months, over which a household is very vulnerable to external stresses and lives hand-to-mouth, moving from one crisis to the next with no prospect of accumulating wealth with which it can improve its situation.

Community and kinship ties also enhance security. Nutritional risk in West Africa is mitigated by social and economic relationships within communities, as for example amongst the Bambara in Mali, where land rights are held at the village level and larger households distribute grain to poor families (McLean 1984). In the Gambia members of a community are expected to help each other in normal times by forming a labour pool, and also in times of difficulty. Under Islamic law a certain percentage of a person's wealth must be given as alms to the poor, with from 8 to 10 percent of food crops being used as such in the Gambian villages Taal (1989) studied. Richards (1986) identified the system of political patron-client relationships which exists generally in Sierra Leone, as being the most common and effective "safety net" available to both rich and poor villagers. Prominent villagers (known as 'big men') support and are in turn protected by a patron at the chiefdom or national level. In effect patrons gain access to labour, and clients to capital (both of which are in short supply), through such relationships. Patrons turn to clients to provide political support (e.g., in chieftaincy contests) and clients receive subsistence support (e.g., rice when the hungry season is severe), financial and help with disputes and court cases. Interhousehold transfers (gifts and loans) occur as a part of a strategy of risk aversion within an extended family, where transfers flow from better-off households to those

which are worse off. Such transfers accounted for 11% of all household income in urban Honduras, effectively supporting one-third of poor households (Kaufman and Lindauer 1984). In India interhousehold gifts accounted for 4.7% of mean household income, and loans for 28.7%. A majority of the gifts and about one fourth of loans came from outside the village (Rosenzweig 1988).

Intrahousehold factors also significantly affect risk, particularly health and nutritional risk in children. In most of sub-Saharan Africa women are major agricultural producers, and in West Africa most women have their own budgets, control resources, and make decisions based on those resources (Orubuloye et al 1991). In Sierra Leone it is common for wives to tend their own rice plots and vegetable gardens in addition to the household plots, and they maintain control of their earnings from these (Richards 1986). Co-wives prefer not to pool resources in order to care for the needs of their own children, and wives in monogamous households in urban Nigeria were believed to prefer not to pool resources with husbands because of the husbands' spending on extrahousehold matters (Karanja-Diejomaoh 1978).

3.3 Economic Impacts of Illness

Decisions taken by the household to invest in timely treatment take the costs of illness as well as the cost of treatment into account. Haswell (1975) observed in the Gambia that borrowing for 'medicine' was a social necessity in communities living near the margin of subsistence, in which sickness of individual members of some households, particularly the smaller ones, was a major catastrophe at critical times in the agricultural season. There was great fear of personal accident or illness which might have disastrous effects on the economic position of the family. Corbett (1989) reviewed published data in the context of Chambers' (1983a) hypothesis that sickness can be a "ratchet" which leads to the further impoverishment of already resource-poor households. In general, 'buffers' such as reserves of cash allow households to cope with contingencies without adverse economic consequences, but households which lack these buffers have little choice but to reduce consumption of necessities, or to sell or mortgage vital assets which can prejudice the future economic

position of the household. She discerned two types of resource drain on the poor: the high costs of allopathic health care with its stringent payment terms, and the time lost from work because of incapacity due to the illness.

Pryer (1989) found in urban Bangladesh that loss of income for households in the lowest earning quartile due to illness of household wage earners was as much as 74% of normal monthly household income, and the relative risk of a severely malnourished child coming from a household with an incapacitated earner was 2.5 times greater than from other households. The relationship between disease and productivity for subsistence farmers is less clear-cut, and is probably disease-specific. However, there is little clear evidence of a relationship between disease and decreased productivity and poverty in spite of the obvious suffering and economic disruption, because households cope with illness and death (Over et al 1991). The coping effects of fatal illness can include displacement of other household members from their normal activities, or sacrifice of investment in schooling. Audibert (1986) found the elasticity of marketed yield of rice per acre with respect to household prevalence of schistosomiasis to be as high as -0.5 in Cameroon, but no significant effect was seen for malaria, perhaps due to the immunity to this disease acquired by most adults. When other household members substitute for agricultural labour lost to illness, their extra efforts can take their toll on the health, welfare, and long-term productivity of the household if the amount substituted is great.

The effects of reduced food consumption due to increased household cash expenditures can be estimated, if only approximately. Cohen (1981) extrapolated the nutritional effect of an additional expenditure (on tobacco products) equal to the 4% of income already spent on health care, on a poor Bangladeshi family that spends all its income on food, housing, and clothing. Assuming a marginal rate of expenditure on food of 70%, the additional expenditure would result in a monthly deficit of 8000 calories - nearly a quarter of the monthly energy maintenance requirements of a 12 kg child. Given the already precarious existence of children, even small differences in food intake may make the difference between death and

survival, with mortality for young children doubling for each 10% decline below 80% weight-for age.

The foregoing results tend to validate the concept of the "poverty ratchet." If a household is to recover from an adult death or serious illness, it must be able to weather a period of hardship with its human and productive capital intact. If forced to sell its productive assets or sacrifice the health of its other members by undernourishing and overworking them, it may pass below a threshold of poverty from which it cannot escape.

3.4 Seasonality

Economic variables are seasonal in much of the developing world because of climate and the rhythm of agricultural production. In many regions farmers may have significant amounts of cash only after harvests are sold, and may also be short of food just before the harvest as subsistence stocks of staple foods become depleted. Non-farmers will be affected as well, by seasonal changes in food prices and availability. These normal seasonal effects have been described by Chambers (1981) as 'screws' which drive people into poverty from which they get temporary reprieve in the dry season, while protracted stresses such as famine are 'ratchets' which lead to an irrecoverable loss of resources. These effects may be more extreme in sub-Saharan Africa than in Asia because of less irrigation of cropland, poorer infrastructure for moving price-compensating grain, more severe drought in bad years, and modes of land ownership less conducive to obtaining credit by mortgaging (Lipton 1986). There are also important differences within the sub-Saharan African region: the severe drought of the early 1980's had little effect on the economies of the coastal states but were devastating for the Sahelian countries. Various mechanisms for coping with seasonal food shortages exist and are therefore widely used in sub-Saharan Africa, including intercropping and selection of crops with high resistance to moisture stress, raising livestock, and family and community solidarity.

Chambers and Longhurst (1986) observed that emergencies such as illness occur at all times of the year but tend to concentrate in the lean,

difficult seasons. Many common diseases are seasonal because of weather patterns, availability of food, and the life cycle of disease vectors. Deaths and funerals are consequently more common, with these expenses also adding to the burden of food scarcity. The ability to pay even the relatively small costs of primary health care may be seriously reduced at times, and travel to health facilities is difficult because of the need to work on farms and the poor condition of roads. Mwabu (1989) observed in Kenya that the opportunity cost of time for travel and waiting for medical treatment in the wet season increases far above its level in the dry season, and thus patients are less likely to seek treatment for their illnesses, especially those not perceived as severe. Operational research studies in India and Honduras have identified seasonality as a variable affecting ability to pay for health care (PRICOR 1987). Coreil (1983) found in Haiti that cyclical variations in available cash were greater than wealth differences within peasant communities. Seasonally reduced financial and physical access to health care may be especially serious in the West African rice-farming belt, where planting activity is intense during the wet season and diarrhoea, guinea worm, malaria, and skin infections increase (Akin et al 1985).

3.5 Treatment choice as a form of coping strategy

For poor households, the decisions made in response to serious or protracted illness are ways of coping with the additional economic stress. Corbett (1989) noted various strategies that households lacking buffers use to minimize risk of impoverishment due to illness, including preventive care, taking immediate curative care, and not seeking treatment if it is likely to impoverish the household. Even if households do not invest much in preventive measures, once a household member falls sick they attempt to minimize the costs to the household by immediate remedial action. Opting for no treatment until it is evident that the illness has become serious is a strategy likely to be observed in households which do not have access to good information about treatment options, which have little access to good quality cheap treatment, and which lack buffers or access to credit.

As with food emergencies, families resort to inter-household transfers to cope with illness. In Senegal, 45% of all patients with

insufficient funds to buy prescribed drugs immediately sought help from others, usually family members. A majority of households reported that they had been asked for help in paying for prescribed drugs (WHO/DAP 1991).

3.5.1 Benefits and costs of self-treatment

Self-treatment with traditional remedies or with modern pharmaceuticals is probably the most common response to illness in both the developing and the developed world. A subject of much anthropological research, it has been the focus of recent attention for reasons related to the PHC concept of self-reliance and as a means of extending the coverage of formal health care systems, and out of concern for the potential dangers and economic consequences of the (medically) irrational use of potent drugs. Hardon (1987) reported that 80 percent of infant diarrhoeal and cough/cold spells are treated in rural Philippines without consulting a doctor. Over-the-counter drugs from pharmacies were the most common first line of treatment in urban Mexico, especially for diarrhoea, headache, cough, and stomach ache, and more often by members of lower socio-economic groups (Logan 1983). Relatively little is known about traditional and herbal remedies; by far most of what has been written concerns self-medication with modern drugs (Criel 1989), and many studies (e.g., Logan 1983) have documented the supplementation and gradual replacement of traditional remedies by inexpensive modern drugs. As this research was intended to clarify the problem of affordability of government primary health care services, in view of the high rate of use of alternatives it was necessary to have an understanding of reasons other than cost why people might choose to use 'non-medical' forms of treatment.

Health care conditions in Cameroon (i.e., great distance to hospitals, charges in mission hospitals, health centres nearby but lacking drugs and staff) made it likely that people restrict themselves to self-treatment even when they might prefer to seek the help of a competent outsider (Van der Geest 1988). Self treatment is made possible by drug vendors who bring products even to the most remote villages. Lasker (1981) also emphasized the accessibility of health services as the key factor in the decisions made in response to illness, but Criel (1989) pointed out the inconsistency of this view with the prevalence of self-medication in developed countries, where access to health services is unproblematic.

Some observers emphasize the important role of tradition or personal preference. Nchinda (1977) concluded from the relatively high utilization of traditional practitioners and other forms of self-treatment found in rural Cameroon that the provision of Western medicine alone did not deter people from using traditional methods as frontline or supportive therapy. The importance of personal beliefs and preferences was also suggested by Mwabu's (1986) findings in rural Kenya that certain illnesses were associated with high rates of initial visits to specific types of providers, (e.g., pharmacies and shops for fever and headache, traditional healers for asthma and body pain, government clinics for wounds).

The true reason for the popularity of self-treatment probably lies in some combination of costs, access, and preference, as summarized by Van der Geest (1988):

"Self-care is an individual's first and most common reaction to the experience of feeling unwell; it is a non-decision. In developed countries it is a convenient alternative to medical consultation, but in poor countries people often have no other choice than to treat themselves. Where health facilities are difficult to reach, self-medication can be an explicit decision following deliberation about the costs and benefits of taking such a step. The decision to seek outside medical help may be postponed or rejected in favour of self-care because of obstacles which are anticipated (lack of transport, financial problems, the time factor, social distance)."

Van der Geest attributed the popularity of using drugs from small shops or from peddlers in Cameroon to the ways the drug vendors respond better to the needs of the poor than such formal institutions as hospitals, health centres and pharmacies: a) they are more affordable; clients can buy as much as suits their self-treatment need at that moment; b) they are more accessible: there will usually be a peddler within a radius of a few kms., and they are available day or night, in contrast with the rigid schedule of formal health services; c) the social distance between client and provider is narrower. In Mexico, the reasons given most often referred to the efficacy of the remedies, the ease of communicating with the pharmacy employees, and the low cost (Logan 1983).

Weighed against these advantages is the clients' awareness that the vendors have little medical knowledge, that the choice of medicines is

limited, and the quality of drugs may be inferior to those available from the health services. If perception of quality of a given provider is affected by the results of previous visits, as suggested by Bitran (1988a), then in Kenya pharmacies are attractive for convenience reasons rather than for quality: Mwabu (1986) found that the rate of return for follow-up visits to providers was related to the results obtained initially, and return visits to pharmacies were low. From the perspective of medical professionals and economists, the disadvantages of self-treatment lie in the inappropriate use of dangerous products and in the high cost of many commercial products purchased through private pharmacies. Van der Geest (1982) cited examples of antibiotic resistance attributed to the sale of small doses by peddlers in Africa, the misuse of chloramphenicol against typhoid fever in Mexico, and the misuse of anti-diarrhoeals worldwide. References to high household expenditures on drugs were mentioned in the previous chapter. Bledsoe and Goubaud (1985) studied how the Mende of Sierra Leone have reinterpreted the function of the many western medicines that are available to them in the framework of traditional beliefs and treatments. The Mende uses of medicines are therefore consistent with Mende beliefs, but when viewed from the western perspective, they are inappropriate and even harmful.

3.5.2 Behavioural Models of Treatment Choice

Based on empirical data collected in Nigeria, Igun (1979) proposed a model of health-seeking behaviour that took into account the multiple well-defined systems of medicine and health care available, the uses and effects of the patient's social network, and the stages of treatment. Based on the assumption that patients always make rational (i.e, utility-maximizing) choices, Igun's patient moves from the first stage of health-seeking, in which the symptoms are experienced and are associated with being sick, to the self-treatment stage, if he believes he understands and can attach a label to the symptoms, and perceives the symptoms as capable of being removed by self-medication. The third stage, of seeking treatment from an external source, is reached when he decides that self-treatment will not give the desired results.

A model which takes into account price effects on treatment choice was used to describe and successfully quantify (comparing actual with

predicted choices) health-seeking behaviour by the anthropologist Young (1981), who found that the potentially complex decisions of choosing a provider by individuals in a Mexican community could be reduced to a simple algorithm consisting of yes-no choices. Four criteria were found to be primarily involved in these decisions: 1) the seriousness of the illness; 2) whether an appropriate home remedy was known for the illness; 3) the person's estimate of the relative likelihood of cure using folk medicine as compared with medical treatment; and 4) the costs and transportation requirements associated with the medical treatment alternative and the availability of resources to meet these. Young described the decision process as an ordering of the available alternatives along one of two dimensions: the likelihood of cure for illnesses believed to be life-threatening, and the costs of less serious illnesses (or nearly all illnesses for poorer households). Since the only option which was considered to represent a significant price barrier was the use of a Western medical practitioner, the availability of sufficient money entered the decision only after it had been decided that the illness was grave and that Western medicine was more likely to achieve a cure than folk medicine.

Van der Geest (1988) contrasted Young's decision framework with a simpler explanation of reasons for using self-treatment:

"The preference for a drug vendor has to be viewed within a range of therapeutic choices. People with a medical problem will first try treatment which costs them little. Only when this fails will other, more costly, more inconvenient, steps be taken."

Yet the following African woman seems to be saying that this is much more a consequence of poverty than of preference:

"If they or their children fall sick, even in the less stressed villages, the men will not pay anything for them to go to a clinic. Instead, the women have to go to the bush to look for traditional leaves, or go to a traditional herbalist, whom they pay with a kola nut or two. If they see no improvement, they sell groundnuts to raise some money to go in search of western medicine... As women said: if you see us using traditional leaves happily, it is because we don't have the money to get western medicine" (Welbourn 1991).

Summary

This chapter has reviewed approaches to defining poverty and vulnerability to economic stress relevant to rural subsistence farming communities. While African farmers may be the poorest in the world, there is a variety of evidence that they are also capable of successfully coping with economic stress because of land tenure patterns and community traditions of mutual support. Compared with other developing regions, there is relatively little inequality in rural areas. Seasonal changes can affect both income and health status, often negatively at the same time.

Coping with illness often takes the form of low-cost self-treatment with modern drugs or herbal remedies, but these may carry health risks. Inclination towards self-treatment may be as strong a force propelling people toward the use of market drugs and traditional practices as price is in deterring people from medical treatment. In environments where the two exist together it may be difficult to separate the two effects on choice of treatment.

Chapter 4:

Sierra Leone: Background to the Research Setting

4.0 Introduction

This chapter provides a description of the physical, demographic, and economic environment of the country where the field research was carried out. The circumstances which led to structural adjustment measures, and the effects of structural adjustment on health and health services is also described, as is the background to the Bamako Initiative programme of cost recovery for drugs in primary health care.

4.1 Physical Characteristics

Sierra Leone is one of the smaller countries of Africa, located on the west coast about 630 miles north of the equator. The Atlantic Ocean coastline is 212 miles in length, and it borders Guinea to the north and east and Liberia to the east and south. Total land area is 29,925 square miles.

Five main physical regions characterize Sierra Leone and its agricultural base: the small western peninsula upland region, which includes the capital Freetown with its large natural harbour and consists mainly of forested mountainous terrain; the western coastal swamps area covering the estuaries of the main rivers, where rice is cultivated in drained areas and fishing is economically important; the central plains region where rice and other food crops are grown on irrigated plots; the northern region of woodlands savannah, best suited for livestock and vegetable and fruit production; and the southeastern upland region, where rice is grown on inland swamps and upland fields and small tree crop plantations produce coffee, cacao, and oil palm.

The climate is tropical, with constant high temperatures and high humidity. There are two well-defined seasons: a hot, dry season from November to April and a rainy season from May to October. Yearly average temperature is 26 degrees C (80 degrees F), and annual rainfall ranges from

3.5 meters (136 inches) in the west to under 2 meters (78 inches) in the northeast. Although Sierra Leone lies within the West African rain forest zone, there is little left of the primeval forest that once existed, having been replaced by secondary forest as a result of shifting cultivation practices.

Administratively, the country is divided into the Northern, Eastern, and Southern provinces which are subdivided into twelve districts and 146 chiefdoms, and the Western Area which includes Freetown. Approximately 1/4 of the population lives in urban areas of 10,000 or more. Freetown itself has about a half million inhabitants, densely packed into a geographically restricted area. Population density of the country as a whole is about 130 per square mile.

4.2 Demographic and ethnic characteristics

The 1990 population was estimated to be 4.0 million, with a growth rate of 2.3% per annum. Crude birth rate has remained constant since 1965 at 48 per 1000, while the crude death rate has dropped from 31 in 1965 to 24 in 1986 (World Bank 1988b). Life expectancy at birth is estimated at 46 for men and 50 for women. The high fertility and mortality levels have resulted in a youthful age structure, with 44% of the population under the age of 14.

There are some 18 ethnic groups in Sierra Leone of which two, the Mende in the South and East and the Temne in the North, are about equal in number and account for about 60% of the population. Lebanese and Indian immigrants dominate the commercial sector and account for the majority of the non-African population. Krio, the language of the freed slaves from the West Indies who colonized the Western area in the early 19th century, is the lingua franca of all tribes. English is the official language, and is the language of school instruction after class 3.

Islam is the dominant religion, practiced by about 95% of the rural population. Christianity is relatively important in urban areas, and animism is an important element of both Muslim and Christian life. Secret societies are equally important among all tribes (except the Krios),

offering initiation rites to adolescents of both sexes involving circumcision and training in traditional practices.

Educational levels are very low, especially among females in rural areas, where the literacy rate is 12% (ILO/JASPA 1990). Among males in rural areas it is perhaps twice that figure.

4.3 Health services

Infant and child mortality in Sierra Leone are among the highest in the world at 165 and 273 per thousand, and probably exceed these levels in most rural areas. These grim health statistics reflect nutritional and environmental factors which put everyone at severe risk of a variety of infectious diseases. Poor access to, and low quality of, health services plays an equal part. Health infrastructure expanded after independence, from a main hospital in Freetown and a few small district hospitals to a network of government hospitals in each district, with a referral system to three provincial hospitals and the large Connaught Hospital in the capital. The 27 government hospitals have a total of 2,451 beds at present, 53% of which are in the Western Area. This is supplemented by 10 mission hospitals and 40 mission clinics, most of which are in rural areas. Doctors have been trained abroad (a medical school was established in Freetown in 1989) and a nursing school exists in Freetown. In the 1970s a programme was started to build health posts staffed by a variety of paramedical cadres in each chiefdom, often through local self-help initiatives.

Primary health care was expanded in the early 1980s, with MCH aides and community health officers (trained at a new paramedical school) providing most rural health care. A comprehensive plan for PHC organization and activities extending down from the district hospitals, health centres, MCH posts, and village health workers was promulgated in 1984 (Decosas 1990). The implementation of the plan has not gone smoothly, being interrupted by suspension of a major World Bank project and a sharp reduction in MOH budgets. A Village Health Worker scheme never got beyond the pilot project stage. At present there are about 370 peripheral health units (PHUs) of three main types, most of which are in rural areas. The

167 Community Health Centres (CHCs) have preventive, promotive, and curative functions, and are nominally staffed by a community health officer with two years training (or by a nurse/dispenser of an older cadre of health workers) and a female State Enrolled Community Health Nurse, who are assisted by an MCH Aide and a public health inspector and ancillary workers. The CHC may have as many as four or six beds for emergency and maternity cases. The 107 Community Health Posts (CHPs) have similar functions to the CHCs but have no beds and are staffed at present by an older paramedical cadre who have had some recent retraining. There are also 75 MCH Posts which are staffed by MCH Aides, and who supervise and are assisted by several trained traditional birth attendants. This type of facility has one or two rooms available as a clinic or for deliveries, and a small complement of basic MCH drugs and obstetrical supplies. The system is managed by district-level PHC management teams. It was estimated in 1989 that about 35% of the population in the rural areas (comprising some 70% of the total population) was within a 1 hour walk (3-mile radius) of a PHU.

Other options for curative treatment in rural areas include self-treatment with a considerable range of traditional herbal remedies, many of which are prepared at home, self-treatment with drugs sold by itinerant peddlers and small shops, consultation with government staff in their own homes for private treatment, and traditional practitioners. There are virtually no private medical practitioners or licensed pharmacies outside of the district headquarter towns.

4.4 The economy

The country is well endowed with natural resources, and more than 75% of the population earn their living from the land or sea. Agriculture contributes about 40% of gross domestic product (GDP). The majority of farmers are subsistence farmers, the main crops being rice, yams, millet and cassava. The country was a net rice exporter until the mid-1970s. Coffee, cacao, palm oil, ginger, and palm fibre are now exported in significant quantities. There are important mineral deposits of gold, diamonds, iron ore, rutile (titanium ore), and bauxite. Unfortunately, serious mistakes have been made in the management of the economy, and the

world economy has impinged negatively on Sierra Leone's, since the mid-1970s. The country's natural wealth has not been converted into improved welfare for the vast majority, who now suffer one of the poorest living standards in the world¹.

Per capita incomes increased by a respectable 3.5% per annum during the immediate post-independence era of the 1960s. The 1970s brought economic stagnation due mainly to the oil shock and the closure of the country's only iron mines. The 1980s witnessed a sharp decline in real per capita income, with the level at the end of the decade remaining about the same level as in the early 1960s, and 82% of what it had been in 1970. Between 1980 and 1987 per capita consumption decreased by 20%, per capita government consumption by 40%, per capita investment by 50%, and per capita imports by 70% (CSO 1990). Trends in average per capita income in terms of hard currency are obscured by fluctuations in the exchange rate, but GDP per capita per year averaged over the last five years was only \$211, considerably less than the 1987 official figure of \$310.

In the wake of the first oil shock, the government pursued a series of short-term fiscal counter-cyclical programmes that spanned the rest of the 1970s. This option resulted in large budget and balance of payments deficits, but failed to arrest or reverse the economic crisis. The deficits were financed through international and domestic lending, leading to a rapid increase in the country's indebtedness and in debt service charges. In an attempt to increase the supply of foreign exchange, the leone was gradually devalued.

The main causes of economic decay during the 1980s can be classified into external and internal categories. With regard to the external factors, the international economic environment has been extremely unfavourable to Sierra Leone, with the weighted index of terms of trade (1980 = 100) falling dramatically from 121 in 1979 to 54 in 1989 (CSO 1990). Other factors were the worsened access to the international capital markets and the decline in international development assistance. The

¹A UNDP Human Development Index based on life expectancy, adult literacy, and purchasing power placed Sierra Leone third from last among 130 countries in 1990. Compared to other West African countries, the index was less than half that of Nigeria, Liberia, Ghana, and Côte d'Ivoire.

combined effect of falling terms of trade, increasing debt service charges and declining capital inflows resulted in acute shortages of foreign exchange that pushed the country into default on its external debt obligations. At present the external debt of Sierra Leone, while not extremely high in absolute terms at approximately US\$ 200 million, is approximately 25% of GNP and is considered essentially unserviceable (ILO/JASPA 1990).

Internal factors contributed in no small way to the economic decay of the 1980s. These can be classified as structural ones and those which have been policy-induced (ILO/JASPA 1990). The structural factors refer to the major constraints on development, including the decline in diamond and gold exports, stagnating agricultural exports, and the rapidly deteriorating state of the infrastructure. Domestic policies and faulty decisions have aggravated the difficult structural environment. Some observers trace these back to a decision to close down the railway in the 1970s, which was uneconomical to operate but provided the only mass transportation for agricultural produce from the rural hinterland. A similarly ill-informed decision was taken to close the iron mines at Marampa, resulting in large drops in exports and employment. A massive investment in infrastructure to host the 1980 OAU conference had a temporary effect in stimulating the economy, but resulted in no assets of long-term public benefit. A large number of agricultural development schemes have had little effect on the rural economy, which remains dominated by subsistence smallholdings and traditional practices. Fundamental policy reforms have seldom been formulated in a comprehensive manner, and their implementation has been fragmented and affected by corruption, with the resulting effects of stagnation seen in all sectors of the economy. The growing fiscal deficits and associated expansionist monetary policies accelerated inflation, spawned a thriving parallel market for foreign currency, increased the smuggling of export commodities (especially diamonds) and the reluctance of exporters to surrender proceeds to the banking system, and reduced the ability of government to mobilise foreign exchange for essential imports and debt service obligations (Longhurst et al 1987).

4.4.1 Government Budgetary Operations

The collapse of the economy resulted in the government's inability to collect sufficient revenue to finance essential public services. Total government revenue as a percentage of GDP declined from 28% in 1978/79 to 7% from 1984 to 1986, recovered temporarily to about 11% in 1987 and 1988, hit an all-time low of 5.1% in 1989/90, and most recently stood at 7.8% (CSO 1990). Grants represent only about 20% of government revenue, and the taxation ratio of only 6 to 10% is extremely low compared to other similar countries.

Public expenditures at the beginning of the 1980s were very high at 30% of GDP, but have since dropped to 17%, mostly at the expense of development expenditure. Government employment is still considered too high by the World Bank (personal communication) but the percentage of the recurrent budget given toward wages and salaries has been reduced as real salaries in the public sector declined steeply during the 1980s.

Despite efforts to increase revenues and curtail expenditures, the fact that 54% of public expenditure is earmarked for debt servicing has caused the budget deficit to remain at approximately 7 to 9% of GDP in the last four years. This deficit has been mostly financed through Central Bank lending (equal to 20% of the money supply in 1989/90), which added significantly to the inflationary pressure in the economy. The economy has been dealt a further severe blow since 1990 by the costs of military incursions into the southeastern part of the country by Liberian rebel forces. Expenditures on defence increased from 8.4% in 88/89 to 9.4% in 89/90, and climbed more sharply in 1991.

4.4.2 Inflation and Exchange Rates

Inflation remained below 4% per annum from independence until the oil shocks of the 1970s, when it surged to 15%. It began to accelerate much more rapidly in 1983, when the first significant devaluation of the leone took place, and averaged 65% per annum through the 1980s. There has been a close correlation between inflation and devaluation, with variations in the exchange rate explaining 96% of the variations in the inflation rate (ILO/JASPA 1990). Various methods of revaluing the leone were tried over the past decade, with a floating exchange system again in effect since May

1990. However, the 100-fold devaluation which occurred during the 1980s was ineffective in either increasing exports or bringing in capital, with a similar rate of inflation being its only obvious effect, probably because the deficit was essentially not trade-related (ILO/JASPA 1990).

4.4.3 Stabilization, structural adjustment and economic reform

In the 1970s the government attempted to address the grave economic situation through extensive consultations with international financial institutions. By and large, these programmes failed, mainly due to the inability of the banking system to exercise control over credit to the government and the government's persistent resort to short-term borrowing on onerous terms and to extra-budgetary expenditures (Longhurst et al 1987). In 1981, a 3-year extended fund facility was started but canceled after the first tranche was disbursed, and a 1984 standby arrangement with the IMF underwent the same fate. Discussions with the World Bank in 1984 for a structural adjustment programme were inconclusive but resulted in a loan for a health sector project. At the end of 1986, a 1-year standby arrangement was signed with the IMF, but was again cancelled after the first tranche was paid. In 1988 Sierra Leone was declared ineligible to use IMF resources, and the health sector project was suspended. In all, only 60.5 million SDRs were utilized of the 259.4 million agreed during the 1980s, illustrating the difficulty of the relationship between the government and the international lenders.

Since 1986, negotiations have continued with the IMF and the World Bank on the basis of a "shadow programme" of conditionalities monitored by the institutions, but without any financial disbursement and support. Most of the conditionalities have been standard in nature, focusing on devaluation, credit restrictions, budget expenditure controls, import liberalization, decontrol of prices, removal of consumer subsidies, and higher producer prices and interest rates. Some conditions were satisfied, most significantly devaluation of the leone, the removal of subsidies on rice and petrol, and the privatisation of rice imports, but the main problem for the lenders was the failure to control the budget deficit.

4.4.4 The effects of structural adjustment and stabilisation measures

Those measures which were carried out occurred rapidly, causing considerable shocks to the economy, and the effects have fallen most heavily on vulnerable groups (Longhurst et al 1987) which constitute a high proportion of the population due to highly skewed income distribution. Sierra Leone is in the group of countries in which the poorest 40% of the population receive less than 12% of total GNP (Chenery et al 1974). The poor, who spend a high proportion of their incomes on food, were hard hit by the removal of the rice subsidy in June 1986 which led to a 300 percent rise in its price over the following year. Devaluation, higher fuel prices, and increased producer prices caused other food prices to rise rapidly in proportion to that of rice, most significantly the price of the next two most costly food items, fish and palm oil. And while there are at least some lower-priced substitutes for rice in the rural areas, notably home-grown cassava, in urban areas cassava is more expensive than rice. Between 1980 and 1986 the Freetown consumer price index (CPI) increased by a factor of 15, while nominal wages rose by a factor of 4, leaving waged workers 26 percent as well off as they had been in 1980. A pilot expenditures and income survey in 1988 showed that 40 percent of the urban population was living below an income level that would buy minimum nutritional requirements, a large increase from 1978 when the comparable figure was 25 percent (ILO/JASPA 1990). However, this type of calculation appears to be very sensitive to the definition of basic requirements: an analysis of 1977 data found that 65 percent of urban and 66% of rural households had incomes below that required to meet a "basic needs" package (World Bank 1981). Average real household expenditure on food dropped by 13 percent in urban areas over the period 1978 to 1989.

The relative effects on rural areas are less clear. Self-sufficiency of farmers has decreased from 93 percent of household food requirements in 1971 to 64 percent in 1985 (UNICEF/MONDEP 1989). Longhurst suggested that farmers might experience a net benefit due to increased producer prices, but those without cash crops or a rice surplus would be as hard hit as urban dwellers. To date there have been no studies to confirm this, but increased transportation costs and the fall in world prices for coffee and cacao since 1987 would certainly have eroded earlier gains in some farming areas. Average real household expenditure on food in rural areas dropped by 10 percent over the decade ending in 1988 (ILO/JASPA 1990). Longhurst

observed that the ability to insulate the community from the immediate shocks of the stabilisation measures appears to be stronger the further the community is away from urban, town or roadside centres, where the adverse pull effects of the cash economy appear less apparent or imminent, and, "the speed with which urban price and economic changes are translated into the economic and cash activities in rural communities cannot be underestimated."

A comparison of child nutritional data from a 1978 survey with preliminary results of one carried out in October 1989 reveals little change in stunting (below 90% of standard weight-for-age) or underweight (below 80% of standard weight-for-age) categories, but there was a rise in acute malnutrition (below 80% of standard weight-for-height) from 3.0 percent to 4.8 percent on a national level. However, the two surveys were not done at the same time of year, and this last increase could be due to seasonal differences in food availability (ILO/JASPA 1990). The 1989 survey found large urban-rural differences in the three nutritional criteria, of a nature that might reflect better food availability but higher infection rates in the rural areas.

Most donor-financed inputs to health have gone to primary health care, which has grown rapidly, led by successful pilot projects in three rural districts and followed rather unevenly by expansion throughout the country. Since 1986, programmes in immunization, diarrhoeal disease control, and essential drugs have been strengthened by donors. While there had been a drop in rates of about 25 percent between the 1974 and 1985 censuses, infant and child mortality data is not considered reliable enough to discern any clear trends over the period following structural adjustment, or to attribute any improvements to these programmes (UNICEF 1989).

The delivery of rural government services was severely affected by the steep rise in the price of petrol and diesel, and has since been further constricted by budget cutbacks. In 1989/90 the health budget stood at 2.3 percent of total public expenditures, down from 4.4 percent in the two preceding years and a high of 9 percent in 1984 (CSO 1990), and was equal to US\$ 0.64 per capita. About 57 percent of this expenditure goes

to paying the salaries and wages of approximately 1900 permanent, 3500 temporary, and 6000 daily-waged personnel. It is unreasonable to attribute the cutback in government services entirely to adjustment and stabilization measures: it could be argued that the reduction in non-salary recurrent expenditures was rather due to a recommended stabilization measure (reducing government employment) that was not carried out.

A high proportion of recurrent health care costs is financed by outside donors, either through contributions of inputs to government public health programmes, or by subsidizing non-governmental health facilities, mainly the network of missionary clinics and hospitals which provides as much as 30% of primary and 50% of secondary care in rural areas. Development expenditures on health constituted about 10 percent of the total development budget from 1986 to 1989, nearly all financed through foreign sources.

4.5 Rural household economics

The context and interpretation of health expenditures is dependent on the overall economics of the household. In Sierra Leone, 75 percent of the total population, and perhaps 90 percent of the rural population, depends on agriculture for subsistence and cash income. As discussed in Chapter 3, reductions in agricultural production and food consumption are possible outcomes of ill-health and significant expenditures on treatment, so information about the existing levels of income, production and consumption are needed to assess the effects of user charges. While most of the available data is about 15 years old, it is unlikely that conditions and practices have changed significantly in the rural areas.

4.5.1 The farming sector

Only 5% of the total land area is under cultivation, predominantly by small-scale farmers using manual techniques. The average farmer cultivates less than 2 hectares (UNICEF/MONDEP 1989), the main constraint to expansion being a shortage of labour during peak seasons (Richards 1986). Since most of the arable land is unexploited, pressure on land as such is not serious, but fallow periods have become progressively shorter as the population has increased. Most land is owned communally, with

family land holdings being the most common variant. Most members of a community obtain access to land by settlement, often with a small annual cash payment to the land holding group or chief (Spencer and Byerlee 1977).

The basic economic unit in the rural areas is the household, an extended family unit which produces several crops to meet its food and/or cash requirements. Women have a special responsibility for seeing that their own children are properly fed. Wives of the household head usually have their own separate grain plots, and the vegetable gardens are tended almost exclusively by women. The produce of these separate plots belongs to herself for her own use (Smith et al 1981). Richards (1986) estimated that women claim 40 percent of total household cash income from crops. Rice is the staple food and most important crop in Sierra Leone. Yields vary with the type of soil and cultivation method. Average yields for upland rice in 1975 of from 631 lbs/acre in the North to 770 lbs/acre in the East were reported by Spencer et al (1979). Swamp farms yield more rice than the more traditional upland farms, but the work is more difficult. Richards (1986) calculated yields in the area he studied (Southern Province) of 17-20 bushels per bushel of seed planted for upland rice, and 40-50 bushels per bushel of seed for swamp rice. About 1/3 of farmers in the North and 1/2 in the East plant swamp rice in addition to upland rice. Rivers flow all year round, but there are few places where irrigation is used. Most crops are grown during the rainy season and harvested at the end of the rains or early in the dry season. Intercropping, rather than multiple cropping, is common, with cassava, maize, beans, sorghum, millet, and vegetables being grown on most of the cultivated area.

Labour is the most important and costly factor in the traditional farming system, with the use of capital inputs such as tools, fertilizer, and draught power extremely low. Peak labour requirements are during the wet season when planting and weeding are done, and around harvest time. The household and extended family members living outside the household unit are the major source of farm labour. Labour is also available by hire and by exchange, often through informal groups of farmers in a village who work on each other's farms in turn. Individuals and other groups of labourers are also available for hire. Spencer et al (1979) calculated the return

to household labour and management from upland rice farming at (equivalent of) US\$ 0.08 per hour in the North and US\$ 0.12 per hour in the East. Local labour wage rates were about 80% of these levels. Seeds are obtained from the previous year's crop or from friends. Since the failure of several agriculture development projects, improved seeds have become more costly.

4.5.2 Household Food Consumption

A 1974-75 survey (Smith et al 1981) found that the most important foods consumed in rural areas of Sierra Leone were rice (consumed by every household sampled), palm oil, dried fish, groundnuts, and cassava. Rice constituted 24 percent of the total value of consumption of the average household. The standard meal consists of rice and a sauce of green leaves, onions, peppers, other vegetables, and pieces of fish or meat, cooked in palm oil. 74 percent of rice, 80 percent of cassava, and 52 percent of palm oil consumed were produced within the consuming household, but wide variations existed in the extent to which households concentrated their energies on production for home consumption or for the market. Annual rice consumption was 93 kgs per capita, or 126 kg per consumer equivalent², with rather large differences between regions and tribal groups. Rice is found to be an economically superior good, with specific consumption generally found to increase with income level. Smith et al (1981) examined the effects of market-oriented farming activities on food consumption. For cassava, palm oil, and groundnuts, consumption increased as households produced larger shares of the quantity they consumed, but this was not true for rice. The study could not confirm the hypothesis that there is a net nutritional benefit from the higher incomes due to cash crop activities.

The household budget of the average rural household in Sierra Leone suggests an existence above Lipton's ultra-poverty level, but not by very much. Calculation of a theoretical "basic needs budget" in 1977 showed that food would consume 72 percent of total expenditures (World Bank 1981), and preliminary results from a 1988 expenditure survey (CSO 1988) found actual food expenditures to be about 70 percent of rural budgets over a wide income range. King and Byerlee (1977) found that consumption of all

²Each member of the household is assumed to be equivalent to a specified fraction of an adult male, based on age and sex.

rural food products averaged 65 to 70 percent of total consumption for all income groups, with an average marginal propensity to consume food ranging from 0.54 in the highest decile to 0.84 in the lowest decile. Thus, it would appear that in 1977, even the poorest tenth of the rural population would not have been classified as ultra-poor, but there are no recent comparable studies which shed light on present conditions in the rural areas.

4.5.3 Inter-household and intra-household allocations

Richards (1986) described how Mende households short of rice in the pre-harvest season expect to be able to borrow from those with a surplus, and how farmers in a position to make such loans will do so more to strengthen their patronage relationships than to make an economic profit. Welbourn (1991) observed that most people do not keep cash reserves because most wealth is tied up in goods which people owe or are owed, in line with traditional patron/client relationships. Cash is seen as static and would only lose value.

The main determinant of cash flows in subsistence farming areas is the rice harvest. Typically, small amounts of rice are sold by farmers throughout the year. Farmers who are not under pressure of debt burdens tend to release the bulk of rice in late December or early January, while the indebted repay loans or sell rice to cover other commitments at the peak of the harvest in October or November when prices are lowest. Richards (1986) and others have observed that the standard rice loan by the wealthy, of two bushels repaid for every one bushel given out, matched the price swing from a pre-harvest maximum of Le 18.00-20.00 to immediate post-harvest low of Le 9.00-10.00. Rice sales and remittances were estimated to total only 20-22% of the total harvested, and Richards commented that it was unlikely that the problem of impoverishment due to forced sale of produce at low prices that Hill (1982) noted in northern Nigeria, was general in southern Sierra Leone.

The age of the household has an important effect on well-being in Sierra Leone. Young, newly established households have less child labour and established mutual labour support, or patronage relationships to call

upon. On the other hand, old age and widowhood are usually not associated with poverty (Welbourn 1991).

Within the Mende household, Welbourn noted that it is the man's traditional obligation to provide the food staple, clothing, and farm expenses. School fees, medical expenses, and other products of the cash economy, have no traditional gender delineation attached to them, and are a matter of negotiation between the man and wife. Welbourn noted that as economic stresses have increased, there is a greater tendency for men to opt out of responsibilities and leave matters to the women. Men and women cope with emergency expenses such as for medical treatment in different ways. Men said that they sell produce or possessions to raise the needed cash. While women have their own grain stores, they use them to buy clothes and food for themselves and their children, then are expected to give some grain to their husbands. Men were said to not pay anything if a child falls sick, leaving the mother of the child to use traditional remedies. If the child does not improve, the woman will sell some of her own produce.

In the absence of additional information, the implications of this economic environment on the user fee debate are still unclear. Part of the problem is that data on existing expenditure levels on health care are probably not reliable. The best recent data is from the national income and expenditure survey (CSO 1988) which found health expenditures of about 3% of total expenditures in urban areas, and 3% to 5% in rural areas, well within the range found elsewhere in sub-Saharan Africa. Food consumption and especially marginal consumption data suggest that for the poorest groups, additional expenditures (e.g., on treatment) would have the effect of reducing the amount of food consumed by 70 to 80 percent of the amount spent.

4.6 User Charges in the Health Sector in Sierra Leone

The long history of fees for service in the health sector may place Sierra Leone in a category apart from many other sub-Saharan African countries. Government hospitals have had 'bed fees' for as long as anyone can remember, and although these have been only nominal for many years due

to inflation, they would have been significant when they were instituted. In addition, an unofficial fee for service system has existed for a surprisingly long time. Hardiman and Midgely (1981) reported the results of a survey of rural households undertaken in 1977, which found average treatment costs as follows:

Herbalist	Le 2.56	(US\$ 3.07)
Government dispensary/health centre	Le 4.13	(US\$ 4.95)
Government hospital	Le 15.03	(US\$ 18.03)
Mission hospital	Le 7.28	(US\$ 8.74)

With the steady deterioration of government hospitals, the mission hospitals have seen both outpatients and admissions increase rapidly (Panguma Hospital 1990), even as they were forced to raise prices continuously. These were already high due to their relatively low level of external subsidies (typically from 40 to 60 percent of recurrent costs excluding expatriate salaries).

Edwards et al (1989) reported a study made in the early 1980s, in which the following payments were made for deliveries:

Location	Total Payment (cash + kind)	% paying some part in kind
Hospital	Le 18.59 (US\$ 9.30)	4.3%
PHU	Le 8.74 (US\$ 4.37)	6.2%
Village	Le 5.03 (US\$ 2.51)	26.9%

They noted that transport costs for deliveries in hospitals might easily exceed that paid the practitioner, and felt that this deterred many women, with a resulting high rate of fetal and maternal mortality. Decosas (1990) observed,

"years of underfunding of the health sector have resulted in low staff morale as well as complete depletion of medical supplies and pharmaceuticals. The staff has responded to this situation with the spirit of the entrepreneur, and today most employees (from cleaners to medical director) conduct some kind of private enterprise on the hospital premises: selling food, drugs, bed space, or treatment. Well-stocked private pharmacies have opened in the neighborhood of the facilities,

supplying patients with drugs, dressings, catheters, gloves (for the surgeon), and other medical paraphernalia. Those who can afford it are well served by this system, but once stabilized usually elect transfer to a private hospital in Freetown or Europe; however, for the majority of patients the care is hazardous and frequently completely unavailable. A woman in obstructed labor may well find herself being discharged without being delivered if the family cannot raise the money for the operating room supplies and the surgeon's fee."

Bledsoe and Goubaud (1985) associated the evolution of private practice in Sierra Leone with the decline in drug supplies to government facilities. Theft of drugs from government facilities was widespread, rendering many hospitals and health centres inoperative. Most of these drugs ended up for sale on the street or in private drug stores or in the clinics of private practitioners. They found that because of theft and the overall drop in drug funds,

"a sick person is more likely to find medicines at mission hospitals, private pharmacies owned by government-employed doctors, in clinics of locally trained nurses or licensed and unlicensed dispensers, or from shopkeepers, market women and often illiterate and unlicensed drug salesmen who walk from village to village with drugs bought from large stores in town."

4.6.1 Cost recovery in Primary Health Care

Ministry of Health drug supplies have declined since the early 1970s when the Crown Agents and most other foreign suppliers cut off credit due to arrears by the government. By 1980 the Ministry of Finance could not allocate sufficient foreign exchange to support cash purchases from suppliers, forcing the central medical stores to purchase the majority of MOH requirements from local importers. A 1983 study estimated that the government was paying 150% over world prices for its drug supplies (Fabricant 1983). The amount spent provided only a 3-month supply of drugs.

The general shortage of drugs in Ministry of Health facilities was felt most acutely at the PHUs as the scarce resources were directed towards the urban hospitals. In urban areas if drugs were not available for free in the hospitals, at least patients could take a prescription to a private

pharmacy and get the drug, albeit at a high price. But there are no pharmacies outside of the major towns in Sierra Leone, and low utilization of PHC facilities for curative and preventive services was attributed largely to the lack of drugs (World Bank 1983). With the aim of improving the quantity and reliability of drug supplies, a revolving fund for basic drugs was started in the early 1980's in two PHC pilot projects run by NGOs. A flat fee for all dispensed drugs was charged by village health workers (VHWs) and health centre dispensers, who turned over the cash to a PHC central office, where it was used to purchase new supplies of drugs every few months. In 1983 the programme was working well in three districts, with much credit given to the involvement of the local communities and the chiefdom health committees (Fabricant 1983).

The VHW pilot programme suffered difficulties and was abandoned, but the PHC projects have retained the drug revolving fund feature up to the present. They served as the model for the national-level UNICEF-sponsored Essential Drugs Programme, which began in 1985. After a period of intensive inputs from UNICEF and Africare, the system was operating in all districts, with cost recovery rates ranging from 60% to 90% (PMISU 1989). The Essential Drugs Programme in turn became the basis of the country's Bamako Initiative programme for PHC development, which was enthusiastically promoted by the UNICEF field office. UNICEF provided an initial supply of PHC and MCH kits, funded the construction of district medical stores, the renovation of part of CMS, and purchase of lorries for the distribution of kits to the districts. A 30% markup over the cost of the drug kits was divided equally between the PHU for PHC activities in conjunction with the local community including drugs for indigents and other exempt patients, the district stores to pay for operations, and the central medical stores. District PHC management committees oversaw the organization and training of chiefdom and village health development committees, which were in principle responsible for the local collection and management of funds. The cost of replacement kits was returned to UNICEF, which provided foreign exchange and managed the ordering of replacement kits from its supply division in Copenhagen. For a period of time UNICEF made up the difference between the amounts turned in and the actual needs for replacement of an equal number of kits. At present it continues to provide hard currency in exchange for leones collected by the cost recovery programme, assisting in

solving the problem of inflation by making the exchange as soon as the leones are received and keeping the dollars in an interest-bearing account.

A UNICEF-commissioned assessment of the cost recovery programme (PMISU 1989) indicated that the population and community leaders were satisfied with the programme and believed it had improved the availability and reduced the cost of drugs compared with drug peddlers. However, an attempt by the Ministry of Health in early 1989 to increase the markup to 130% to generate local funds for expanded PHC activities met with resistance, and there was concern that certain aspects of the new PHC development strategy were being perceived in an unfavourable light. The assessment found instances of poor people not using PHUs because the cost of drugs was too high or the units were too distant from their homes. There were reports of higher prices than those officially sanctioned being charged at government facilities, (a phenomenon also observed in Guinea and Benin under Bamako Initiative schemes (Knippenberg et al 1990) and attributed to the low and irregular pay received by health staff). Other factors influencing low utilisation of PHUs were also identified, including the presence of drug peddlers and traditional herbalists.

A question remaining unanswered was whether the benefits of improved supply of drugs at moderate cost (including increased utilisation) outweighed the likelihood that some poor patients were unable to afford them. The task of assessing the effect of the cost recovery programme was made difficult by the lack of baseline data on conditions before the introduction of cost recovery and improved drug supply. The 1989 assessment probed only the opinions of PHU staff and community leaders on this subject. A protocol describing this research was reviewed in July 1989 by UNICEF and MOH officials, who decided that the research could provide immediate and operationally useful information to the programme, and offered to provide full field support for a limited period of time to carry it out in Sierra Leone.

Summary

This chapter has presented background information on Sierra Leone, and described the economic conditions which led to the collapse of essential drug supplies in government health facilities. Donors encouraged and assisted the

establishment of drug revolving funds for primary health care. Structural adjustment had resulted in serious hardships for most of the population, especially urban dwellers, but the question of whether user charges have worked extra hardships on the population is made more complicated by the long history of fee for service in the Sierra Leone health sector.

Chapter 5:

Research Objectives and Methodology

5.0 The research problem and main objectives

Justification for policies which support user charges for government-provided curative primary health care often include the claim that equity can be maintained or improved if consideration is given to establishing 'affordable' fees and protecting the poor and other vulnerable groups. Various approaches to setting prices have been described, but no systematic and objective methods of identifying the poor and establishing operational rules to protect them can be said to exist. This task is complicated by complex and seemingly inconsistent relationships between price, ability to pay, and utilization of services. The truly controlled experimental environment in which a longitudinal study of the effect of introducing user charges on utilization can be carried out is rare, making such a study impossible for most countries trying to implement 'Bamako Initiative' programmes. At the same time, economic and social factors vary widely from one country to another, and can also be expected to vary within a given country, so even if a large-scale study were carried out in one place, the results would not necessarily be applicable elsewhere. The trend toward decentralization implies the establishment of pricing and exemption policies on a local basis, but the complexity of the problem suggests that some type of operational research should be carried out wherever this is done.

5.0.1 The research objectives

This research attempted to add some light to the debate about the effects of user charges on the utilization of PHC and the welfare of individuals and households. A combination of simple quantitative and qualitative methods was used in the field during the early phase of implementing cost recovery for drugs at government PHC facilities. The research aims were:

- A) To assess with the greatest possible precision given the available methods and resources:

1) The economic factors which affect a household's ability to pay the costs of basic curative care.

2) The relative importance of ability to pay, price, distance, seasonality, and personal preferences on the utilization of PHC facilities and household welfare, and the policy implications of these factors.

3) Whether individuals needing exemption on the grounds of inability to pay are known to the community at large or to health personnel, and if not, whether the economic factors identified could be used to identify objectively cases needing exemption; and what community preferences are relating to subsidization of the poor.

B) By paring down the initial comprehensive study to simple steps defining the collection of data on fewer variables and the reduction of data to the level needed to make appropriate policy decisions, to develop a simpler operational research protocol for analyzing characteristics of a target community for the purpose of establishing equitable pricing and exemption policies.

5.1 Development of the methodology

Following a review of the relevant background literature, the basic process was to 1) define a conceptual framework to guide the research; 2) develop methods and instruments for assessing community economic factors and the impact of user fees; and 3) apply them in the selected field areas. The remainder of this chapter describes these steps.

5.1.1 Conceptual framework for instrument development and data analysis

From the perspective of the debate over user charges, there is an underlying assumption that any illness which bears a risk of becoming more serious should be treated by modern allopathic medicine; if an individual is deterred from seeking this it may eventually be more costly to him and to society. It is likely that the accessibility, price, and preference for alternative forms of treatment influence the decision whether or not to make the needed expenditure for allopathic (hereafter referred to as 'medical') treatment. If the choice is made to seek care which has a cash price, the necessary amount will have to be found. One of the main

objections to user charges is that this payment has the potential to adversely affect the welfare of the household.

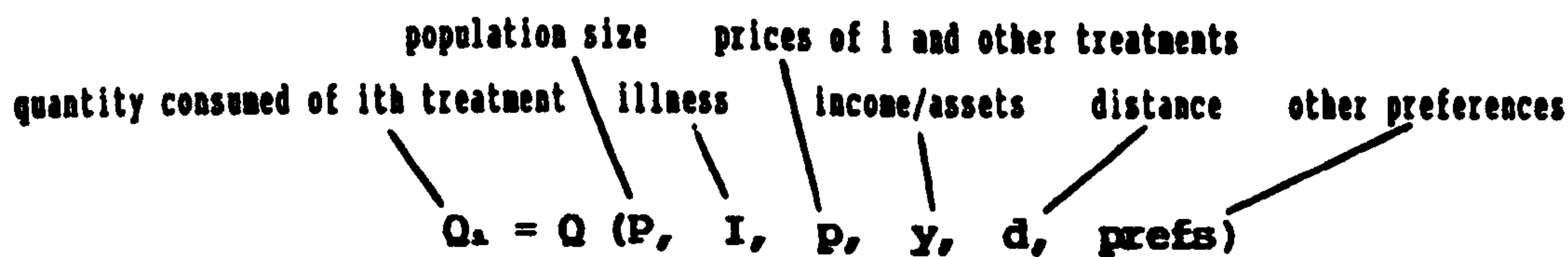
Rural farming households react to unplanned expenditures in several ways, but Nabarro et al (1989) found that the coping reaction chosen is likely to be one which maximises household welfare over a term lasting until a point when they expect conditions to change. Reduction in food expenditures may merely result in short-term hunger, or if carried on for long, in long-term dietary energy deficiency and wasting, stunting, and reduced ability to work. Borrowing money may have little or no adverse effect if the amount is small and the terms of repayment are lenient, or it may result in an spiral of debt from which it is impossible to recover. Sale of assets may have effects ranging from none to financial ruin and dependency if productive assets such as land or animals are sold. The effects of not seeking or delaying treatment can range from none whatever (for self-limiting conditions) to premature death. The principle behind the development of the research methodology was that *equity of access to government PHC is adversely affected where the price of PHC treatment causes a form of treatment assumed to be of lower quality or efficacy to be used when there is a possibility that the illness would become more serious if not treated medically, or if acquiring the price of PHC treatment is likely to cause long-term hardship for the household.*

5.1.2 A Decision Model of Treatment Choice and Price-Deterrence

To quantify the effect of pricing PHC services, the effect of price must be isolated from other influences on utilization such as physical accessibility and preferences. A model was needed which would put empirical data from a household survey into a framework which could be analyzed in an orderly manner, focusing on the effects of preferences, household socio-economic status (SES), prices, physical access, and how money is obtained. The model developed for this research was derived from the classical theory of health care demand, which states that the consumption of a given type of treatment in a population is a function of characteristics of the entire population and of individuals, in particular the population size in the catchment area, the incidence and nature (e.g., type, severity, duration) of illnesses, the price of the treatment and alternative treatments, income distribution of the population, distance of

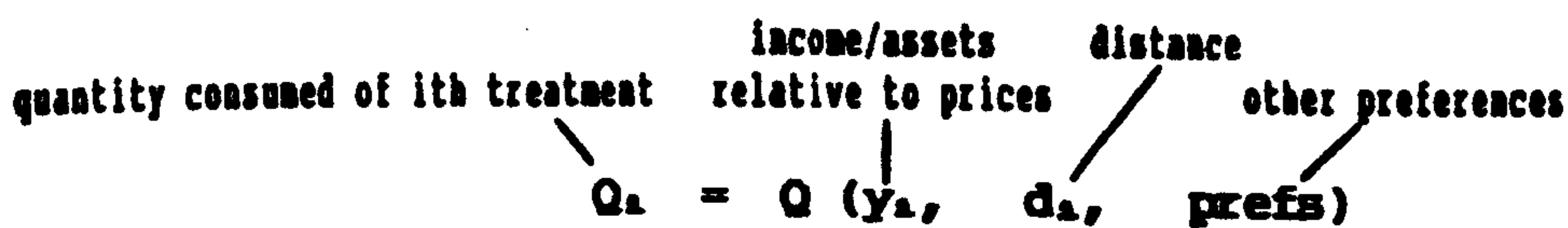
the population from the treatment source, and all other preferences, including the individual's perception of quality and value for money:

(for an entire population)



For a given individual with a particular illness, several variables can be dropped from this relationship, leaving as independent variables only factors related to the individual, including in this case the individual's income relative to the price of the treatment, distance from alternative treatment sources, and the individual's preferences:

(for an individual with a given illness)



Various models of health decision-making were reviewed in Chapter 3. Young's (1981) model, based on a series of discrete choices, seemed a flexible way of representing the variables, and was adapted as shown in Figure 5.1.

Although the actual order in which decisions are made does not affect the final outcome, the steps are shown here in a linear manner for clarity. According to this model, when illness strikes, the consumer's preferences (a complex of the nature and severity of the illness, education, age and sex of the patient, perceived quality, and other, perhaps unmeasurable, characteristics) largely determine what, if any, kind of treatment is sought: medical care, or some type of traditional or self-treatment. If there is good access to a medical facility (a function of distance or travel time and cost), the final choice then rests on ability to pay (ATP)

Young estimated his model using the outcomes of the final discrete choices (e.g., using a western practitioner) to calculate prior probabilities (e.g., of believing in western medicine, of having enough money). In reality, there are 'grey areas' which take the form of continuous variables, such as income, distance from facilities, and the strength of preferences. Data of this nature lends itself to analysis with advanced econometric techniques, but even researchers who use such methods have warned of their difficulties and pitfalls. Conditional logit methods calculate probabilistic demand functions for various treatment options assuming maximization of a household's utility function. Some of the problems of these methods have been described, with perhaps the major one being the difficulty of specifying this utility function. Mwabu and Mwangi (1986), who did in fact use this technique, commented that this "is a difficult and hazardous task because it requires speculation and experimentation on the true structure of a household's preferences", and Bitran (1988) noted that nested multinomial logit, as used by Dor et al (1987) is appropriate only if it is known in advance what factors influence provider-related choices, and that the results obtained from a given dataset can differ sharply depending on which model is used. With these caveats in mind and the intention of replicating the technique on an operations-research level, the dataset was designed to use simpler and better-known analytical techniques.

Mathematical estimation of many scientific models is simplified when a linear, additive relationship between the independent and the dependent variables can be assumed as a first approximation; estimating the parameters becomes a straightforward task of multiple regression analysis. Although the preceding linear presentation of the model suggests that the factors are multiplicative (i.e., the outcome is the product of probabilities), it could equally be argued that all factors combine at the point of decision-making in an additive manner. The fact that the dependent variable, choice of treatment, is not continuous can be dealt with by using nonlinear techniques such as logit, logistic regression, or discriminant analysis. The difficulties become more imposing when nonlinearities enter the model in the form of correlations between variables. For example, income might be related to location, and preference factors might vary with income. The effect of distance may be a combination of a

linear effect of the transport cost and opportunity (time) cost, and a threshold beyond which a sick person does not want to travel. The more nonlinearities, the more difficult, complex and unstable the solutions become. Without knowing the nature of the variables and relationships a priori, the best approach was to be prepared to analyze the quantitative data in a variety of ways, but relying on multiple regression techniques to isolate the partial influences of correlated factors.

Seasonality factors, which can be assumed to affect both access and ability to pay, were not explicitly included in this model. Due to the difficulty of linking the data needed to assess these factors from the two cross-sectional survey (dry and rainy seasons) datasets, interpretation of the results was more straightforward if the main determinant factors are estimated separately for each season.

5.2 Field data collection instrument development

After reviewing the research protocol in New York and Freetown, UNICEF and MOH officials decided that the research could provide operationally useful information for Sierra Leone's Bamako Initiative programme, and offered to provide full field support for a limited period of time to carry it out. A combination of methods was chosen which would provide the needed data in the limited time available in the field. As in other studies of demand for health services, retrospective data were needed on choice and payment of providers, but specific data were also required on how the patient obtained the price of treatment and on the reasons for not seeking medical care. This was needed from non-users of medical care as well as recent users, so a facility-based 'exit-poll' type survey would not yield the necessary information. The objective of learning which, if any, proxy indicators of household socio-economic status (SES) could be used to predict ability to pay, required that this data be obtained for each illness case reported. Overall, the approach called for a household sample survey of the general population using a multi-purpose questionnaire. Fortunately, one of the main resources available was a team of interviewers who were experienced in conducting household surveys in the rural areas of Sierra Leone.

Since household surveys might not be possible for small-scale evaluations of local pricing policy, a small facility-based study component was also included in order to determine how health facility users differed from the population as a whole. Other data on seasonality, identification of the poor, and community attitudes about equity, would also be required from the household survey. Information relating to the effects of distance and seasonality on utilization was also available from health facility records.

The quantitative information was complemented by more qualitative data obtained through case studies of individual households and focus groups conducted at village level. It was originally intended to conduct focus group discussions as a part of questionnaire development, particularly to aid in the selection of socio-economic proxy indicators. The available time in the field did not permit this, but focus groups were used to clarify questions of village life and economics which the household interviews raised but did not explain. The case studies served a similar purpose.

5.2.1 Household survey and questionnaire design

The design of the household survey was guided by the experience of the Planning, Management Information, and Statistics Unit (PMISU) of the MOH, which had carried out several health and nutrition surveys in Sierra Leone, and by literature providing a general view of the problems inherent to this mode of research (Kroeger 1983; Ross and Vaughan 1984; WHO 1986; Hill and Graham 1988).

Demographics, illness, and deaths: Module 1 of the household questionnaire (Appendix 6) covered household demographic variables. Module 2 covered illness episodes within a two-week recall period, the action taken in response to the illness, amounts of money paid in connection with these actions, sources of the money, and information on deaths in a 12-month recall period. A two-week recall period was based on the current view that this provides a good compromise for a single-round survey between the number of episodes captured and accuracy of recall. No effort was made to go farther back in time in the case of chronic illnesses because of concern over losing accuracy, especially for amounts spent, and because the

research objectives would be satisfied by extrapolating from a two-week slice in time.² The lapse of time between the onset of illness and seeking treatment is a related factor which may be associated with ability to pay. This was not addressed explicitly because it was thought that an account of actions taken during the two-week period would represent adequately the economic constraints experienced by the individual and household.

Socio-economic status: The research objectives required a way of assessing the socio-economic status (SES) of households, for three reasons. The first was to be able to determine the deterrent effect of prices on households of different economic levels and different geographic areas. The second was to find the determinants of ability to pay, which could potentially be used as 'objective' indicators for exemptions or a sliding scale. Third, estimates of household income and expenditures were needed to make informed judgements about the effect of existing and increased levels of user charges.

Many discussions of survey methodology have emphasized the difficulty of this type of assessment in rural areas of developing countries. Household income is probably a superior variable by which households may be classified, in that it is an indicator of current consumption which affects and is affected by nutrition and health and is also a proxy for the wealth reserves which enable a household to withstand longer-term stresses, but it is difficult to measure in a household survey. Casley and Lury (1981) cautioned that merely asking for a statement of income coming into the household is likely to be fruitless, even if those with cash incomes are able and willing to reveal them, and that the economic level may have to be judged from the productive activities of household members, agricultural holdings, and expenditures. Important individual components of income may be difficult to measure; Richards (1986) noted in his study of rice farming in southern Sierra Leone that, "there are no particular advantages, and several obvious disadvantages under conditions of

²This decision was justified by a subsequent survey (PNISU 1990) which found that about half of reported illnesses lasted less than 1 week, 85% lasted less than 1 month, and most chronic illnesses were treated only with inexpensive palliatives. Kande and Dow (1987) found that 92% of first treatments took place in the first week of illness.

competitive poverty, in revealing details of the harvest and crop sales to a stranger such as myself". Booker et al (1981) described in detail the problems encountered in a living standards survey in Senegal, leaving the impression that it is nearly impossible to carry out such a study successfully.

Alternatives to survey methods for the assessment of conditions in rural areas have been developed, such as the 'rapid rural appraisal' of Chambers (1983b). A similar mode of research, "farming systems research" has spawned a technique for ranking households in a community by their wealth (Grandin 1988), but this requires spending considerable time in a single community. (This approach was also rejected by the advisory committee, who emphasized that rural villagers feel strongly about not meddling in or even inquiring about the affairs of others.)

Development of the questionnaire was informed by the need to keep interviews down to one hour or less so the required sample numbers could be achieved with available survey resources, and to avoid fatiguing respondents. Given these constraints, it was decided to rely on selected proxy questions to obtain information on household income and wealth. Any question included would also have to be easily answered by any adult respondent. In order for a question to be useful as an indicator for exemptions, its function should not be easily discerned by the respondent, and should convey a hint that the validity of the answer could be easily checked.

The final module of the questionnaire asked the interviewee's opinions about equity and cross-subsidization, and about seasonal factors to learn if they could be assessed in a single-round survey.

Drafts of the questionnaire were reviewed by an advisory committee comprised of MOH officials, the Ministry of Development and Economic Planning, and the Department of Community Medicine of the University of Sierra Leone. Some questions which were too time-consuming to ask or which did not provide information specific to an individual household were eliminated or relegated to the focus group discussions. For example, a question originally proposed asked for what other purposes the money paid

for treatment had been intended. The advisory committee recommended dropping this because it presented the respondent with a hypothetical situation and the responses would be unreliable.

Draft questionnaires were pretested several times, with the resulting final version requiring from 20 to 50 minutes to administer, depending on the number of illness episodes in the household. Pretests suggested that the information given by respondents was consistent and within the ranges expected. Once in the field, however, some original assumptions about the importance of certain factors (e.g., garden crops) proved to be wrong, and additional questions were added for the second district surveyed.

5.2.2 Interviewer training

Based on a requirement of speaking at least one of the local languages of the selected districts, 20 candidates were selected for a week of training. All had previous survey experience and had completed secondary education. Some who had assisted in questionnaire development were sufficiently familiar with the questionnaire to assist as instructors, and the group was also trained in running focus groups by UNICEF staff. The questionnaire was printed in English, and emphasis was placed on the correct oral translation of questions into the local language. Nine interviewers and 4 supervisors were selected for the first field round in Kenema district on the basis of having Mende as a first or second language. The Port Loko team included the best interviewers from the Kenema round plus the remaining Temne speakers. This second group received three days of retraining before going to Port Loko district.

5.2.3 Sample size

The minimum required sample size for a population survey is determined by the approximate proportion of the group under study in the population and the precision required of the measurement of the actual proportion in the population. For a multi-purpose survey which looks at several different sets of population groups, the sample size should be based on the proportion of the smallest group for which a measurement of highest precision is needed. This was the group of people reporting illness but not using medical treatment because of cost. A prior survey in Kambia district of Sierra Leone (PMISU 1988a) had found that 50% had

used medical treatment, with 30% choosing self-treatment with traditional herbs, 11% using self-treatment with western medicines, and 8% using no kind of treatment. There were no grounds for estimating a priori the proportion that did not seek medical treatment for cost reasons among those who were ill, but 40% was considered to be a reasonable estimate. The objective was to measure the proportion of those who did not use medical treatment because of cost (estimated per the above at $50\% \times 40\% = 20\%$) with an acceptable degree of precision.

The Kambia study had found a point-prevalence of morbidity of only 75/1000 during the dry season, with prevalence in a 3-month recall period of 120/1000. This difference suggested that minor illnesses were quickly forgotten. It was reasoned that if a 14-day recall period were used, and if a method of prompting respondents was used to remind respondents of minor illnesses as suggested by Gesler (1979) and Kroeger (1983), a self-reported morbidity rate of about 200/1000 would be found, so if the average household size was 8, 1600 cases of illness would be reported per 1000 surveyed households.

Using a standard method of calculating sample size (WHO 1986), for a proportion of 20% in the population, a sample of 1600 individuals would result in a 95% confidence interval for the entire sample of $20\% \pm 2.0\%$. However, this interval would be roughly doubled to allow for non-independence of choices within a given household (i.e., if all household members are constrained in their care-seeking options by common factors; it was not known a priori whether this was true), and the use of cluster sampling (i.e., households selected from within selected villages rather than from the district as a whole), expanding the confidence interval to $\pm 4.0\%$. If equal numbers of illness cases were surveyed in each of the two districts, the 95% confidence interval for each district would be that of the entire sample multiplied by $\sqrt{2}$, or $\pm 5.6\%$.

The degree of precision represented by this confidence interval would be adequate for most planning purposes if, for example, it were used to estimate the number of exemptions needed. A sample size of 1000 households was considered to be close to the maximum feasible given the length of the questionnaire and the resources available for field work. Since increasing

the sample size would have required a shorter questionnaire and reduced the confidence interval only in proportion to the square root of the increase factor, a sample size of 1000 households was adopted. In the event, higher morbidity rates and household size than assumed were found, and 1156 households were surveyed, with 2543 illness cases reported in a total survey population of 10,190 household members. The 95% confidence interval for the subgroup of interest is nearer to 20% +/- 1.6% for the entire sample, or from 16.8% to 23.2% for the entire sample assuming non-independence, and from 15.5% to 24.5% for each district.¹

5.2.4 Sample Stratification

Since an objective of this research was to develop methods for assessing economic factors on a district rather than a national basis, it was not critical to select the districts randomly. Two districts scheduled for expansion of the PHC programme, Port Loko and Kenema, were selected for the study out of the country's 14 districts, and because the 1989 assessment of the cost recovery programme had been carried out in both places. To the extent that there are differences in economic, cultural, and geographical factors between districts in this small country, they could also be considered to be representative of the country as a whole, while the economic and ethnic differences between the two districts permit useful comparisons.

Port Loko district (1985 est. population 335,000) is part of Sierra Leone's Northern Province, with a long coastline, and an interior suitable mainly for the cultivation of upland and swamp rice. The primary means of livelihood is subsistence farming (rice and cassava), with the average holding only 1.24 hectares in size (MANREF Sierra Leone 1986). It is considered to be a uniformly poor district, but has known better times when a large iron mine was in operation. The population is mostly Temne, one of the two largest ethnic groups in Sierra Leone. There is one large mission hospital in the district, but PHC development had only just begun and there were very few other health facilities for a such a large area.

¹Confidence intervals of similar magnitudes would be expected for proportions of other variables measured in the study, with smaller relative intervals as the proportion approaches 50%, larger as it approaches zero.

Cost recovery for essential drugs for primary health care in government facilities was started in 1988.

Kenema (1985 est. population 329,000) is in the Eastern Province, where diamond mining and cash crops produce a somewhat higher average standard of living than most other parts of the country. Mining activity is limited to the Sewa River basin in the northern part of the district, the chief economic activity of the rest of the district being cash crop and subsistence farming. The average holding is 3.75 hectares, with numerous tree crop plantations of over 6 hectares (MANREF Sierra Leone 1986). Nearly half the country's coffee and over half the cacao is grown in the district. The population is mostly Mende, the country's single largest ethnic group. Private (mining company and mission) hospitals are more numerous than in other districts. PHC has been relatively well developed since 1985, when a programme was launched by the World Bank.

While Kenema has more private health facilities, both districts have a government district hospital,² and every chiefdom in both districts has at least one government PHU. Maps showing the type and locations of health facilities are found in Appendix 5. Taken together the two districts have a population of approximately 92,000 households, so the sample of 1,156 represents a 1.3% sample of the reference population of the two districts. The estimated number of households in all of Sierra Leone is 486,000.

Stratification of the household sample was necessary because of the logistical problems associated with surveys in remote rural areas. Access to villages can be difficult because of very poor roads and barriers such as rivers and hills, and overnight accommodation is found only with difficulty. The household sample was stratified geographically so interviewers could obtain the necessary sample within a limited area over a period of several days, and then move on to another area. The first stratum was the chiefdom, since these political and administrative subdivisions of a district are convenient units for organizing a survey. Two chiefdoms per district were selected, in order to compare results of different physical, social, and economic environments. Consideration was

²There is a second small government hospital in Port Loko district near the international airport at Lungi, but this area is relatively inaccessible to most of the district.

originally given to limiting eligible chiefdoms to those with a minimum number of health facilities or those within a certain distance of a large mission hospital, to be assured of finding enough households that had paid a wide range for health care. Rather than risk biasing the sample it was decided to select chiefdoms at random but to include urban areas² in the sample. Within Kenema district one chiefdom, Malegohun (referred to in the following text as MAL, with 1,908 households, total population 11,700) was selected at random from the northern diamond-mining part of the district and another, Langrama, was selected from an area in the southern part of the district which is economically reliant on farming. Langrama was also identified as an area of very high infant mortality in a previous study (Kandeh and Dow 1987). Langrama chiefdom had a very small population (326 households, total population 1,817), so the adjacent chiefdom, Niawa (976 households, population 5,558), was added to it (the two combined chiefdoms are referred to as LAN in following text). Two chiefdoms were selected at random from the more economically homogeneous Port Loko district, Bureh-Maconteh-Kasseh (BMK: 2,618 households, total population 22,023) and Buya Romende (BUY: 2,746 households, total population 23,439).

The differences in populations between chiefdoms presented a sampling problem which was eventually resolved by opting to facilitate statistical comparisons of chiefdoms by sampling equal numbers of households in each chiefdom rather than equal percentages. The proportion of households sampled therefore ranged from 10 percent in BUY to 20 percent in combined LAN.

A second stratification was made by village. To ensure that a random sample of villages would include a range of distances from health facilities, large-scale maps were obtained and lists were made of villages from 0-3, 3-5, and 5-10 miles from an existing PHU. The number of villages surveyed was set at 8 to 10 per chiefdom based on the average number of households per village (from census data) and experience of what could be accomplished in a given period of time with the number of interviewers and the available transport. Villages with fewer than 20 households were eliminated from the lists for efficiency reasons. Two or three villages

²Urban areas are defined in Sierra Leone as towns with a population of 10,000 or more.

in each distance range were selected at random, and the number of households to be interviewed was calculated to be proportional to village populations and weighted up to a total of about 250 households per chiefdom. Between 30% and 40% of households in each village were surveyed. The principal urban areas in both districts were also sampled, with a total of 99 urban households interviewed in 3 areas (Port Loko town, Lunsar, and Kenema town). Once the interviewers arrived at selected villages, houses were selected quasi-randomly by radiating out from the village centre in all directions, with each interviewer filling his quota by starting at the outskirts, selecting households at random to interview on the way back to the centre.

5.2.5 Household data collection

Field data collection took place in December 1989 and January 1990. The rather large number of field supervisors was essential, as the team divided in two on occasion and the supervisors were also responsible for checking questionnaires before leaving a village. Interesting questions often arose, which were elaborated into case studies with the translation assistance of a supervisor. At other times supervisors were used to interview patients at health facilities while the interviewers were occupied with households in the same village. Photographs of the interview teams and village life are reproduced in Appendix 5.

Protocol required sending an advance party to visit the paramount chief seat before the teams entered a chiefdom. Another advance party moved out to the villages to advise them which day the team would be working there. Village chiefs usually arranged lodging for the team where necessary, and more importantly, asked all household heads to remain at home until the interviews were completed. There were no instances of household members refusing to cooperate.

Quality control for the household survey consisted of an immediate review of all completed questionnaires by the field supervisors, which were rechecked by the researcher or senior PMISU staff while still in the village. One or more pieces of missing or inconsistent data was found in about every third questionnaire, which were given back to the interviewer for immediate correction, often requiring a return to the household. Two

or three interviewers out of the 20 employed required significantly more supervision and correction, and in the case of one it was found later that he had consistently recorded the answer to one question incorrectly. (This was correctable since the interviewer's code number was part of each interview record.) After all questionnaires had been corrected, about 15% of questionnaires were selected at random and kept aside while supervisors returned to the selected houses. Respondents were reinterviewed about illness episodes and expenditures and selected additional questions, and the answers recorded on separate forms. A paper based on the results of this assessment of non-sampling error is included as Appendix 3.

An error in instructions for interviewers in the questionnaire was found after the field data collection had been completed, affecting those cases using drugs already found in the home. The result was that for two subsequent questions these responses are missing, accounting for 4.6% of all cases, or 7.2% of all cases in the important category of using non-medical treatment. While this reduces the total sample for those two questions and for crosstabulations using their results, there was no reason to believe that the absence of those cases introduced any significant bias.

5.2.6 Rainy Season Survey

A followup household survey was carried out in September 1990 during the rainy, pre-harvest season. This time fewer logistic resources were available, limiting the survey to a sample of 200 households in 6 villages. Several questions about sources of health and household expenditures were added in order to clarify some questions which had arisen in the first round of the survey. The main objective of this survey round was to examine the effect of seasonal factors on access, especially on the use of MOH primary health care facilities.

5.3 Other data collection

5.3.1 Facility-based data

To meet the objective of comparing users of health facilities with the general population, the questionnaire for users of health facilities followed the pattern of the household questionnaire, but was pared down so it could be administered more rapidly. 167 patients were interviewed at

health facilities (PHC units, government hospitals, and mission hospitals) to learn if they represented the population as a whole and thus could be used as informants, rather than having to do a community survey for future district-level research. Health facility service statistics were also collected where available at PHUs and mission hospitals where they could supplement other information about utilization, effective catchment area, seasonal effects, and prices charged. Difficulty was experienced in finding enough patients at PHC units and district hospitals, so the majority of the sample was from two mission hospitals. (Because of this bias, and the fact that the users appeared to represent a much wealthier segment of the population, the data were not used in the analysis here, except for one piece of supporting information). Data were also recorded on service statistics and reasons for visits, seasonal changes, prescriptions, and distances traveled by patients.

5.3.2 Focus groups and case studies

One village in each chiefdom was selected randomly for focus group discussions after the household survey had been completed. An initial agenda was based on questions which had arisen during the first few days of household interviews. The village chief was asked to choose ten men and women he felt would represent the village, and when the group gathered in the evening six or seven of these were selected by the survey staff. Other villagers listened in and were occasionally asked to give their opinion on a topic. The discussions were characterized by much repetition and relatively little debate, but some open and lively discussions took place. One supervisor acted as the moderator and another took notes, and the proceedings were also tape recorded. Simultaneous translation into English allowed the investigator to exercise a degree of control over the direction of the sessions. In Port Loko new questions were added to the original agenda to clarify some issues which had arisen. Each focus group lasted about one hour.

As the investigator reviewed questionnaires while in the villages, certain households which exhibited typical or extreme examples of illness or particularly high or low ability to pay, were singled out. A further interview for a case study was made with the help of an interpreter, for eleven households in each district.

5.4 Data entry and analysis

A data entry program using dBase III+ was written for questionnaire data entry on a microcomputer. The only coding done after the field data collection was for the description of the illness or symptoms, which were coded into standard disease classifications by a trained medical statistician. Three completed database files contained questionnaire information on 1156 households, 2543 illness cases, and 426 deaths, with two other files for village and health facility user data. Data entry was verified by comparing printouts from the database files with the original questionnaires. All dBase files were converted to SPSS system files, which linked village-level information such as distance from health facilities with household-level data and data on individual illness cases. The final quantitative analysis was done using SPSS/PC+.

The other survey instruments were analysed qualitatively. Cassette recordings of the four focus groups were translated from Mende and Temne and transcribed, and case studies were prepared from written notes. While systematic analysis of this type of data is sometimes problematic, the uniformity of the questions used provide clear opinions and answers to many key questions about rural household economics. Data from health facility users' questionnaires was entered in a form which permitted comparison with the general population sample.

Chapter 6:

Exploring The Influences on Demand for Medical Treatment

Part A: Morbidity, expenditures, and the preference and access factors

6.0 Introduction

The household survey dataset was designed to depict affordability and equity with respect to price, income, and distance factors. Analysis of the data was guided by the conceptual model described in the preceding chapter, with its primary outcome or dependent variable the choice between medical and non-medical treatment, in particular the choice between government PHC units and self-treatment.

The choice of treatment was assumed to be a function of three primary utilization factors (preferences, access, and ability to pay), in some linear or non-linear combination. The primary intrinsic, household-level factors were considered as independent variables:

a) preference: was assumed to be a combination of the particular illness and its severity, 'western' orientation, age and sex of the patient, perceived quality of services, and other, unmeasured factors.

b) access: was assumed to be related to the distance to fixed health facilities, or related factors such as transport cost and time.

c) ability to pay: a household ATP index was based on the amount of money spent on curative treatment over the recall period and how the money was obtained. It was assumed that this was related to income, assets, and other, unmeasured factors.

Price was implicitly incorporated in the model through the choice of the treatment used. As will be shown, price differences between various treatment options (especially medical vs. non-medical) were so large that there could be little doubt that the consumer was aware beforehand of at least the relative prices, so the choice would be based partly on price. Price was not an explicit independent variable however, so the model is most useful in comparing the characteristics of households rather than the

effects of price differences. Price effects will be noted where appropriate.

Variables from the household survey used in the conceptual model were first examined by cross-tabulation with the dependent variables. The objectives of the first stage of data analysis were to a) identify important variables for inclusion in the model, and b) to ensure that they met the requirements of the statistical methods used later on, transforming the data where necessary and removing outliers. In the second stage, the relative importance of the model's primary factors were estimated using multiple regression, and these results were used to clarify other observations. This chapter discusses the first stage analysis of preference and access variables. Income effects are covered in Chapter 7, and the regression models, including seasonal factors, are discussed in Chapter 8. Seasonality was assumed in the model to affect both access and ability to pay, but to simplify the analysis and interpretation of the results, dry and rainy season models were estimated in Chapter 9 using separate regression models from the datasets of the two survey rounds.

Standard statistical approaches have been used in reporting the quantitative results of the household surveys. For the cross-tabulations of categorical variables, chi-squared tests were used to determine the probability of true associations, and for continuous variables such as amounts paid, one-way analysis of variance (ANOVA) was used to test the significance of differences in means and obtain confidence intervals. ANOVA takes into account the effects of non-sampling error (measured by doing reinterviews, as discussed in detail in Appendix 3). For categorical variables for which high rates of misclassification error were found, since there is no standard method for reporting the total error, the probable effect on the observed association has been noted in the text or the tables.

6.1 Morbidity and mortality in the household sample

6.1.1 Morbidity

Morbidity, the stimulus for seeking treatment, was reported for the two-week recall period. There were 2543 illness cases in the entire

household sample, for an average of 2.2 cases per household. This is higher than found in earlier surveys in Sierra Leone (PMISU 1988a, 1988b), probably because of the use of prompting by interviewers, but is comparable to that found in several other surveys in sub-Saharan Africa. The severity of the illness episode was rated on the basis of the reported duration of adult disability or child abnormal behaviour, with episodes lasting more than one day counted as severe. As seen in Table 6.1, the rates for non-severe episodes (mostly self-limiting minor complaints) were similar in the five geographic areas studied (the 4 rural chiefdoms and combined three largest urban areas in the two districts), but there were large differences in the rates of severe illness. LAN chiefdom stands out with a much higher rate than the others. The urban areas had lower incidence of both severe and non-severe illness. Overall, Kenema district (LAN and MAL) had significantly higher illness incidence than Port Loko district ($p < 0.001$), and differences between chiefdoms were also significant. Specific causes of morbidity are discussed in a later section.

Table 6.1: Per capita morbidity rates by severity and geographic area

	Specific morbidity (rate/1000 population)				
	BMK	BUY	LAN	MAL	URBAN
Severe cases	131	144	205	135	113
Non-severe cases	102	101	98	106	85
Total morbidity	233	245	303	241	198

6.1.2 Mortality:

A total of 426 deaths of household members occurred in the preceding 12 months. The crude death rate in rural Kenema district was significantly ($p = .03$) higher at 46.6/1000 than Port Loko (38.8/1000) or urban areas (24.9/1000). Among chiefdoms, LAN had the highest rate, but the difference was significant only at the $p = .06$ level. While children under 5 years of age accounted for 40.4% of all reported deaths, this age group was just 15.5% of the sampled household population. The adult death rate was proportional to their representation in the sample, and children of age 5

to 14 had the lowest death rate. Males had a slightly higher mortality rate than females.

Infant mortality for the two rural districts was calculated at 153 for Port Loko and 240 for Kenema, but age cohort information was not complete enough to calculate child mortality rates. These IMRs are within about 10% of those obtained in PMISU baseline surveys (PMISU 1988b, 1990), in which the more accurate method of using numbers of live births per mother was used to calculate IMR and CMRs (Appendix Table A1.1).

Causes of death (as recorded by the interviewer and later coded by a medical statistician) by chiefdom are shown in Appendix Table A1.2. Malaria/fever was the most common cause of death, with respiratory infection the second leading cause, followed by infectious diseases including neonatal tetanus. Compared to a previous specific study of infant and child mortality (Kandeh and Dow 1987), it appears that deaths from tetanus may have been under-reported. The chiefdom having the highest incidence of malaria morbidity also had the highest reported death rate from malaria. Most deaths were due to causes that could be prevented or treated before progressing to a fatal stage by effective PHC.

6.2 Choice of treatment

Table 6.2 shows the choice of treatment used, for the entire dry season sample by geographic area. There were significant differences between areas, but self-treatment with market drugs was the most common treatment option used overall, followed by self-treatment with traditional herbs. Treatments included in the latter category were mostly self-prepared, but 18% involved payment of a herbalist. Use of other traditional practitioners was mostly reserved for chronic cases which had not responded to medical treatment, or severe cases in which witchcraft was believed to be involved. Among medical treatment choices, government PHC units (PHU) were used most frequently, followed by consulting PHU staff members privately, using mission hospitals, and using government district hospitals. In the analysis of this utilization data, visits to government or mission hospitals, private allopathic practitioners, and PHU staff seen privately, are grouped under the rubric 'other medical'. PHU visits plus

'other medical' thus equal 'all medical'. For the entire sample, some form of medical treatment was chosen as a first response in 35.3% of illness episodes. Some differences in utilization between geographic areas, such as the low utilization of PHUs and high use of mission hospitals in BUY, were due at least in part to factors which were known before the survey, specifically the frequent closure of one PHU in BUY and good access to a mission hospital in that chiefdom.

Table 6.2: Percentage of cases using treatment options as a first action, by geographic area.

First Action Taken	Percent Using Treatment Choice						
	PORT LOKO DIST		KENEMA DIST		URBAN		
	BNK	BUY	LAN	NAL		Total Treatment Percent (cases)	
*GOVERNMENT DIST HOSPITAL	.2	1.2	1.7	1.3	16.9	2.2%	56
GOVERNMENT PHC UNIT (PHU)	29.0	6.5	24.2	20.2	5.6	20.1%	510
*MISSION HOSPITAL	.8	12.0	.9	5.9	9.0	5.4%	137
DRUGS FROM PEDDLER	22.5	39.2	23.2	24.5	21.9	27.5%	697
TRADITIONAL HEALER	4.2	3.2	9.3	2.6	.6	4.6%	117
*GOVERNMENT STAFF PRIVATELY	1.7	3.6	7.1	12.3	10.7	6.5%	165
HERBAL TREATMENT	20.8	20.8	22.3	11.8	10.7	20.2%	513
*PRIVATE HOSPITAL/PRACTITIONER		.2	.5	1.3	9.6	1.1%	28
HAD DRUGS AT HOME	3.7	3.6	5.7	4.2	8.4	4.6%	118
NO TREATMENT	9.0	9.8	5.1	7.9	6.7	7.8%	198
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Geographic Area Cases Percent	520 20.5	665 26.2	633 24.9	543 21.4	178 7.0	100.0	2539

* = 'other medical' treatment

6.2.1 Subsequent actions taken in illness episodes

A second action was taken in 11.5% of illness episodes, and a third in 0.5% of cases. As seen in Appendix Table A1.3, self-treatment with herbs rather than drugs was the most common second action, and greater use was also made of hospitals. People appear to be highly flexible in their choice of treatment: a different type of treatment was usually tried if the

first treatment failed to effect a cure. Table 6.3 shows that 94% of those who used traditional treatment (herbal self-treatment or a traditional healer) used a different category for a second treatment, with most switching to medical treatment. 87% of those using market drugs first changed, with most trying traditional treatment next. 69% of those using medical treatment first changed, with most trying a traditional treatment next.

Table 6.3: Second type of treatment used by first type of treatment used

<i>Count Col pct Second Treatment</i>	First Treatment			<i>Row Total</i>
	MEDICAL	MARKET DRUGS	TRAD'L	
MEDICAL	37 31.4	21 30.0	52 59.1	110 39.9
MARKET DRUGS	22 18.6	9 12.9	31 35.2	62 22.5
TRADITIONAL	59 50.0	40 57.1	5 5.7	104 37.7
<i>Column Total</i>	118 42.8	70 25.4	88 31.9	276 100.0

6.2.2 Treatments used in cases resulting in death

Appendix Table A1.4 shows that a much higher proportion of cases (62.4% vs 35.3%) ending in death received medical treatment than general illness cases, with PHUs the most frequently used source of treatment. Mission hospitals were used more often than for first actions, and much higher use was even made of the government district hospitals, which did not have a reputation for good quality care. The most common second action taken in cases ending in death was use of traditional herbal treatment or a traditional healer.

6.3 Deterrence from use of medical treatment

When some type of non-medical treatment or no treatment was used, the respondent was asked the reason for choosing that treatment. Responses were coded by the interviewer, with results shown in Table 6.4. Lack of money was given as the main reason in 53.1% of cases.

Table 6.4: Reason for not using medical treatment (first actions)

	Geographic Area						
REASON	Pct	BNK	BUY	LAN	NAL	URB	All
THOUGHT NOT SERIOUS		11.0	12.5	6.1	15.4	31.3	11.9
NOT BETTER SOON		.7	4.5	1.1	1.2	3.0	2.1
TOO FAR TO TRAVEL		5.7	8.0	24.4	10.3	1.5	12.1
NOT ENOUGH MONEY		54.6	51.6	55.2	53.8	41.8	53.1
DON'T LIKE PHU, STAFF		1.4	1.5	.3	1.2		1.0
THOUGHT DRUGS UNAVAILABLE		2.1	.5	1.3	2.8		1.5
NOT EFFECTIVE FOR PROBLEM		8.2	7.3	2.1	2.0		4.7
KNEW A SELF-TREATMENT		13.1	7.3	4.2	8.3	14.9	8.2
OTHER		.7	2.8	3.7	2.8	7.5	2.8
PHU WAS CLOSED		.7	2.3	*	*	*	.8
DON'T KNOW		1.8	1.8	1.6	2.4		1.7
Column Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Area Cases		282	399	377	253	67	1378
Area Percent		20.5	29.0	27.4	18.4	4.9	100.0

* this response was coded only in Port Loko district

34.3% of illness cases² were apparently deterred from medical treatment by lack of money. This high proportion would seem to indicate a serious problem of affordability, so the data were examined in closer detail. Most of the response patterns appeared reasonable: for example, the highest rate of 'too far to travel' in LAN was consistent with mean distances to both PHUs and hospitals being greatest there. But given the low use of PHUs in BUY, a higher response was expected for 'PHU was closed'. Examination of village-wise data suggested that the low utilization was due to the fact that most of the PHUs in this chiefdom were MCH units, which provide fewer services than Community Health Centres and Posts. Urban areas were apparently less affected by financial problems than rural areas. The quality control reinterviews (Appendix 3) indicated that while most other individual response categories for reasons were

²Calculated by multiplying the 64.7% that did not use medical treatment by 0.531, the proportion that said they did not have enough money.

reliable, there was confusion of 'too far to travel' with 'not enough money', suggesting that some respondents had been confronted with the problem of insufficient money for both transport and treatment, or that lack of transport or lack of time might have been the more accurate reason for others. The true confidence interval¹ for this category is probably nearer $\pm 6\%$ rather than the $\pm 1.2\%$ due to sampling error alone. (This had the effect of reducing the statistical significance of the difference between the urban and rural areas to the 90%, or $p < 0.10$, level.)

The reasons given for non-medical treatment for second actions (Appendix Table A1.5) differed from first actions mainly in the high proportion of those who had used medical treatment initially and thought the medical practitioner would not have been effective.

6.4 Amounts paid for treatment

The total cash amount² paid in connection with an illness episode was closely associated with the type of treatment used, as shown in Table 6.5a. The lower part of the table also indicates considerable differences between geographical areas. Differences between mean amounts paid for different kinds of treatment (except for traditional practitioners) were statistically significant ($p < 0.0001$) for the sample as a whole and for each geographical area taken alone. This was also true when treatments were grouped into the general classifications which will be used in the analysis of treatment choice: PHU, other medical (government and mission hospitals, PHU staff seen privately³, and other private allopathic practitioners),

¹When the question was asked the second time, 11% of sampled respondents gave a different answer. The rate for the category 'not enough money' increased from 51.5% to 59.4%, and the category 'too far to travel' dropped almost the same amount. The 'gross error' (see Appendix 3 for an explanation) for the category 'not enough money' was -11 %, but there is no accepted way to use this non-sampling error to modify the confidence interval of the variable. As a first approximation, the likely non-sampling error was taken as $0.5(\pm 11\%)$, or $\pm 5.5\%$, which when combined with the sampling error of $\pm 1.2\%$ resulted in a total error of $\pm 6\%$.

²Travel time was treated as a separate determinant in this analysis. Waiting time was negligible except for hospital outpatient visits, and even then the value of this time was small compared to cash amounts paid.

³Prices paid to PHU staff seen privately were lower than the other options included in the 'other medical' group. This classification was used throughout the analysis rather than grouping those providers with PHU visits, because they behaved as private practitioners, were seen as an alternative

self-treatment with drugs (either purchasing drugs or using drugs already at home), self-treatment with herbs, and traditional healer, as shown in Table 6.5b. Similar patterns were seen in each geographic area, and also for the amounts paid for second actions (Appendix Table A1.6).

Table 6.5a: Mean and median amounts spent on illness episodes by treatment used and geographic area

For all Chiefdoms	Amount Paid For Action - leones				
	Consultation and Drugs	Travel and Incidentals ^a	Mean Total Paid	Median Total Paid	Percent paying zero
GOV'T DISTRICT HOSPITAL ^b (n=56)	342.1	138.0	480.1	200	1.9%
GOV'T PHU (n=510)	129.0	4.3	133.3	70	10.4%
MISSION HOSPITAL ^b (n=137)	500.5	169.4	669.9	280	0.1%
DRUGS FROM MARKET ^c (n=697)	55.7	0.1	55.8	24	0.7%
TRADITIONAL HEALER (n=117)	83.7	5.1	88.8	20	23.6%
GOV'T STAFF PRIVATELY ^b (n=165)	172.9	15.6	188.5	90	9.1%
HERBAL SELF-TREATMENT (n=513)	8.1	0.1	8.2	0	82.2%
PRIVATE DOCTOR/HOSP ^b (n=28)	482.9	153.5	636.4	160	7.1%
HAD DRUGS AT HOME ^c (n=118)	0	0	0.0	0	100.0%
NO TREATMENT (n=198)	0	0	0.0	0	100.0%
For all Treatments					
BHK chiefdom	51.4	3.0	54.4	10	42.7%
BUY chiefdom	85.1	15.0	100.1	20	34.2%
LAN chiefdom	73.8	19.0	92.8	20	34.8%
MAL chiefdom	161.0	31.6	192.6	40	28.0%
URBAN areas	139.7	0.2	139.9	40	31.2%

Notes to Table 6.5a:

- ^a Only cash prices were considered in this table
- ^b Grouped as 'other medical'
- ^c Grouped as 'market drugs'.

The differences between geographic areas seen in Table 6.5a are due mainly to much higher amounts paid for PHU treatment in MAL and the higher cost of transport to hospital in MAL. The last column of Table 6.5a indicates the rate at which patients are exempted or have charged deferred. The high exemption rate reported for traditional healers was due to the

to the PHU, and probably would not be bound by official pricing policies.

practice of not demanding payment until the often lengthy treatment is finished. Interviewers' notes revealed that most exemptions in the PHUs were because the patient was a relative of a staff member. The low average cost of treatment in BMK was due in part to the low rate of using mission hospitals there, but lower prices were also found to have been charged for PHU treatment in that chiefdom.

The PHU price levels observed indicated that there had been a high level of overcharging by staff. The official prices of drugs included a 30% markup, but as shown in Table 6.5c, the actual prices charged were perhaps 5 times the official prices in Port Loko district and 8 times in Kenema district. Some of this markup was used by staff to cover transport costs for replenishing drug supplies and the patients they treated free. Some staff said they used a higher markup on cheaper treatments such as for malaria in order to keep the price of more expensive treatments low, but while there were few accurate prescription records kept, the price data in general does not support that claim (except that the full price of injections appears to not have been charged in some cases). In fact, it was fairly well known to senior MOH officials that staff had been substituting the unofficial markup for salaries which had not been received for months.

Table 6.5b: Mean amounts paid by grouped treatment types

Treatment Type	Range paid	Mean Amount Spent per episode (Le)	S.D.	95% Confidence Interval
PHU	0-1792	133.1	210.1	114.3-152.3
Other medical	0-7000	425.9	831.0	338.5-513.5
Drugs self-treat.	0-2000	47.3	105.9	39.8-54.8
Herbs	0-500	8.2	38.9	4.8-11.6
Traditional Pract.	0-2000	88.8	229.5	45.4-132.1

Table 6.5c: Comparison of PHU prices charged (Le) by geographic area

	All treatments		Malaria only ^a	
	Child (n)	Adult (n)	Child (n)	Adult (n)
BMK	73.0 (64)	151.8 (72)	51.3 (24)	136.4 (9)
BUY	86.4 (14)	67.1 (21)	79.0 (5)	50.0 (2)
LAN	83.1 (66)	130.9 (82)	83.8 (25)	229.9 (17)
MAL	138.8 (80)	261.0 (64)	122.2 (43)	326.7 (12)
URB	40.0 (5)	124.0 (5)	0 (1)	160.0 (2)

^a Includes cases with anaemia. Official prices of drugs were chloroquine tablets 150 mg base: Le 0.90 ea, aspirin tablets 300 mg: Le 0.20 ea, folic acid Le 0.20 ea, chloroquine syrup 50ml vial Le 15.00 ea. A course of treatment (including folic acid) should have cost Le 18.00 for adults, and Le 9.00 for children or Le 18.00 if chloroquine syrup was given.

Mean amounts paid were considerably higher than the median amounts because of a small number of cases in which amounts up to 25 times the mean were paid, and, for some treatments, because of some cases paying nothing at all. The two measures are highly correlated, and both are useful in these analyses: the means represent total spending of a group of cases but say little about the distribution, while the medians provide information about the distribution but do not reflect the effect of individual high expenditures. Table 6.5d shows the preponderance of low prices paid for individual first actions, resulting in a mean of Le 108.7, but a median of only Le 20.0.

Table 6.5d: Distribution of treatment costs, full sample (first actions)

Price range (Le)	Percent of Cases
0	34.5%
1-20	18.9%
21-50	14.0%
51-100	14.3%
101-200	8.6%
201-500	5.4%
501-1000	2.7%
1001-2000	1.0%
> 2000	0.6%

6.4.1 Total health expenditures and expenditure by treatment option

Total expenditure during the 2-week recall period for the entire sample was Le 302,796, or Le 261.9 per household. The large difference in the prices of different treatment options is thrown into sharp relief when the portion of total spending is compared to relative use (Table 6.6a). PHU use, which comprised 20.2% of first actions, accounted for 20.7% (c.i., 16.3 - 24.1) of total spending, but 'other medical' use (15.4% of first actions) accounted for 62.1% (c.i., 46.8 - 77.4) of total expenditures. In contrast, drugs (31.8% of first actions) accounted for only 12.1% (c.i., 9.6 - 14.6) of spending. These proportions varied widely between geographic areas because of the different utilization patterns and price levels. (These expenditures on treatment are compared with household income in Chapter 7.)

The distribution of household aggregate spending in the recall period is less skewed than the distribution of prices of individual treatments shown in Table 6.5d. Most households had more than one illness case, and only rarely were low amounts paid for all actions in all cases. Table 6.6b shows that most households still paid relatively little (the median amount was Le 80) while a few paid high amounts. However, it is impossible to conclude from this data that a similar skewed distribution would be found for expenditures over the course of a year.

Table 6.6a: Proportion of total health expenditure by treatment option and geographic area

Treatment Choice	Geographic Area					
	ALL	BMK	BUY	LAN	MAL	URBAN
Government PHU	20.7%	53.7%	3.7%	26.5%	22.3%	5.9%
Other medical	62.1%	14.1%	77.2%	45.5%	70.1%	76.3%
Self-treat drugs	12.1%	16.9%	18.0%	16.6%	5.4%	13.8%
Self-treat herbs	1.7%	8.4%	1.3%	0.8%	0.9%	0.3%
Trad. healer	4.7%	10.5%	2.2%	10.5%	1.9%	3.9%
	101.3%	103.6%	102.4%	99.9%	100.6%	100.2%

Table 6.6b: Distribution of aggregate treatment expenditures, full sample

Expenditures (Le)	Percent of Cases
0	18.2%
1-20	13.5%
21-50	10.7%
51-100	13.7%
101-200	13.0%
201-500	16.2%
501-1000	7.9%
1001-2000	3.1%
2001-4000	2.6%
> 4000	1.1%

6.4.2 Awareness of prices

Respondents who said they did not use medical treatment because of insufficient money were asked how much they thought medical treatment in general would have cost¹. This could be considered a hypothetical question, but allowance was made for respondents not knowing (55% did not know), and they were not prompted for an answer. Figure 6.1 compares the mean amounts that respondents expected medical treatment would have cost with the mean actual prices paid locally for PHU and 'other medical' treatment. In all geographical areas except BMK and the urban areas, the mean amounts stated (by respondents who answered the question) were much closer to the actual local mean cost of treatment at hospitals and private practitioners, and were from 2 to 6 times higher than the mean cost of PHU treatment. A similar relationship was found when median amounts were compared. Differences between means of actual and supposed costs were statistically significant ($p < .001$).

The extent of mistaken expectations can be judged from the fact that only 25% of respondents (including those who said they did not know the cost) thought medical treatment would have cost less than Le 300, a level

¹Interviewers were instructed to ask: "how much would you have paid if you went to a 'doctor' to get medicine?" Any allopathic provider including PHU dispensers and community health officers were thought of as 'doctors'.

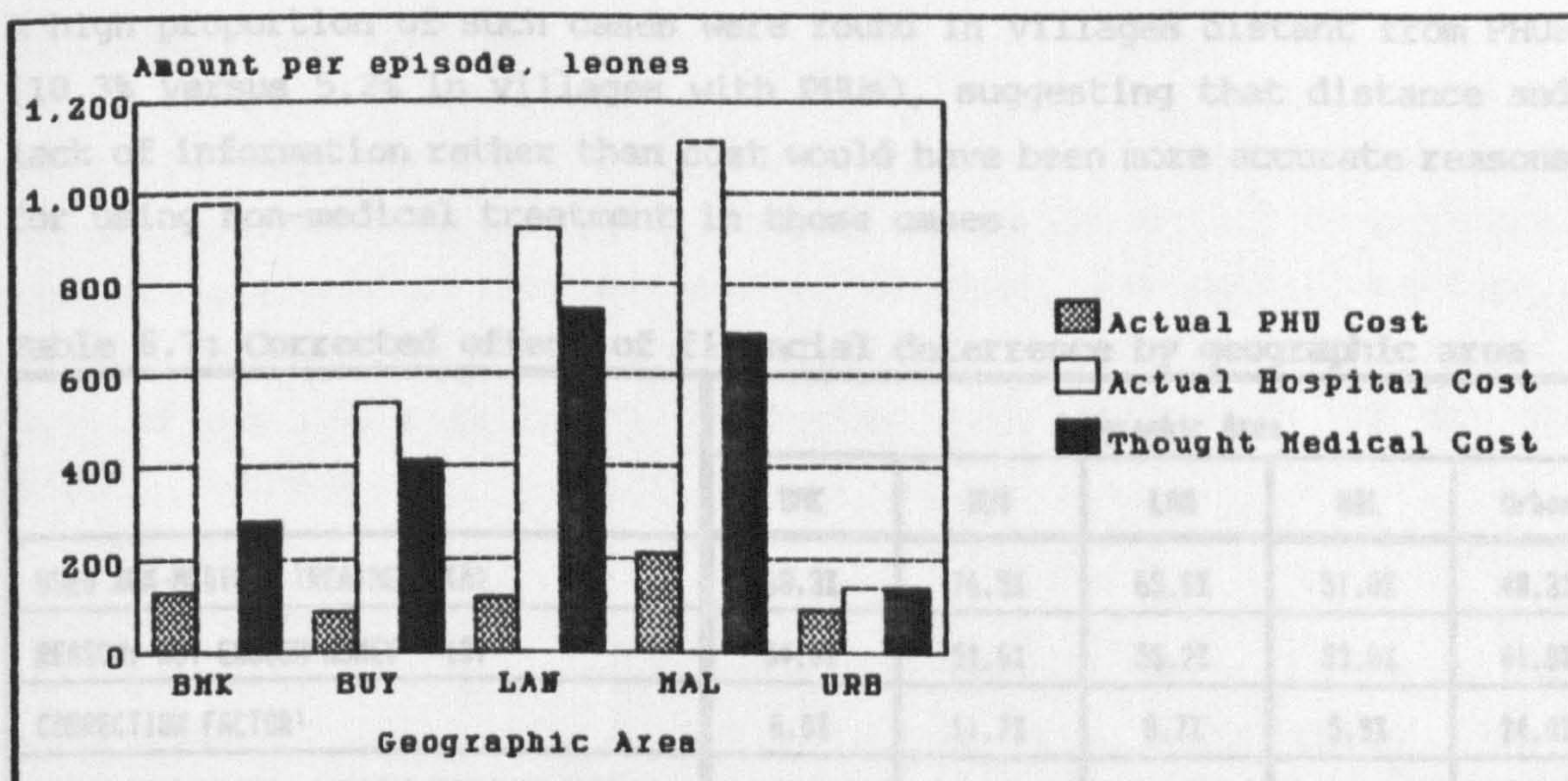


Figure 6.1: Mean amount respondent expected medical treatment would have cost versus actual PHU and hospital costs. (note: 'BMK' hospital costs are based on only 2 cases)

higher than that paid in 90% of all PHU visits. Differences in expected price between different household income groups were not statistically significant. However, respondents located nearer to PHUs gave more accurate answers (mean responses were Le 321 for respondents within 0.5 mile of a PHU, Le 569 from 1 to 5 miles, and Le 737 beyond 5 miles, with $p < .001$). Because there was no such effect versus distance to a hospital, this must have been due to the nearer respondents having better information, rather than the more distant ones including the cost of transportation in their estimates.

6.4.3 Correction to financial deterrence

While only small amounts were spent in most cases in which 'not enough money' was given as a reason for not using medical treatment, in about 9% of these cases the amount actually spent on drugs or traditional healers exceeded the median amount paid locally for PHU treatment. This meant that either these cases were not correctly informed about the cost of PHU treatments or the reason given was incorrect since money was actually on hand. In either case, for the purpose of estimating the degree that enough money would not have been on hand, these cases should not be counted as being deterred for financial reasons. Making this correction reduced the actual rate of financial deterrence for the sample to 31.2%. Table 6.7 shows the correction factors applied to each geographical area.

A high proportion of such cases were found in villages distant from PHUs (10.3% versus 5.2% in villages with PHUs), suggesting that distance and lack of information rather than cost would have been more accurate reasons for using non-medical treatment in those cases.

Table 6.7: Corrected effect of financial deterrence by geographic area

	Geographic Area				
	DNK	BUY	LAN	MAL	Urban
USED NON-MEDICAL TREATMENT (A)	68.3%	76.5%	65.6%	51.0%	48.3%
REASON: NOT ENOUGH MONEY (B)	54.6%	51.6%	55.2%	53.8%	41.8%
CORRECTION FACTOR ¹	6.0%	11.7%	8.7%	5.9%	24.0%
CORRECTED REASON: NOT ENOUGH MONEY (B')	51.3%	45.6%	50.4%	50.6%	31.8%
DETERRED FROM MEDICAL TREATMENT BECAUSE OF LACK OF MONEY (A x B')	35.0%	34.9%	33.1%	25.8%	15.4%

¹Percent of cases that gave 'not enough money' as reason, where more than the median PHU cost was spent

Amounts paid in the case of deaths were considerably higher for most treatment types than the amounts paid for episodes when no death occurred, as shown in Appendix Table A1.7. The geographic pattern was similar to that seen for other illnesses.

6.4.4 Deterrence and severity

In the definition of the conceptual model only those cases which were deterred and would have required medical treatment are considered at risk. This latter criterion is of course difficult to judge, but a safe first approximation is that most of the cases reported as not being severe had self-limiting symptoms which medical treatment might have alleviated sooner but which would not have become more serious without treatment. Of the cases deterred for financial reasons (corrected), 53.6% were severe, not significantly less than the overall average of 59.3% severe. Differences with respect to geographic area were statistically significant, with 63.7% of deterred cases in LAN being severe, as compared to only 39.7% in MAL.

6.5 Preference Variables

All variables in the dataset representing household or case characteristics not obviously related to access or ability to pay were crosstabulated against treatment choice. Of these, severity, illness type, age, and an education proxy were retained as preference variables on the basis of possibly significant independent association with the use of medical treatment.

6.5.1 Perception of quality

Perceived quality has been used as a preference factor in some models of determinants of consumer demand for health (e.g, Bitran 1988a). The results obtained from treatment can be considered to be a proxy for quality; this was asked for each illness episode. The results shown in Figure 6.2 reflect the aggregate perceptions of efficacy (i.e., quality) by the entire sample or subsample. More positive perceptions ('got better') and fewer negative perceptions ('remained the same') were obtained

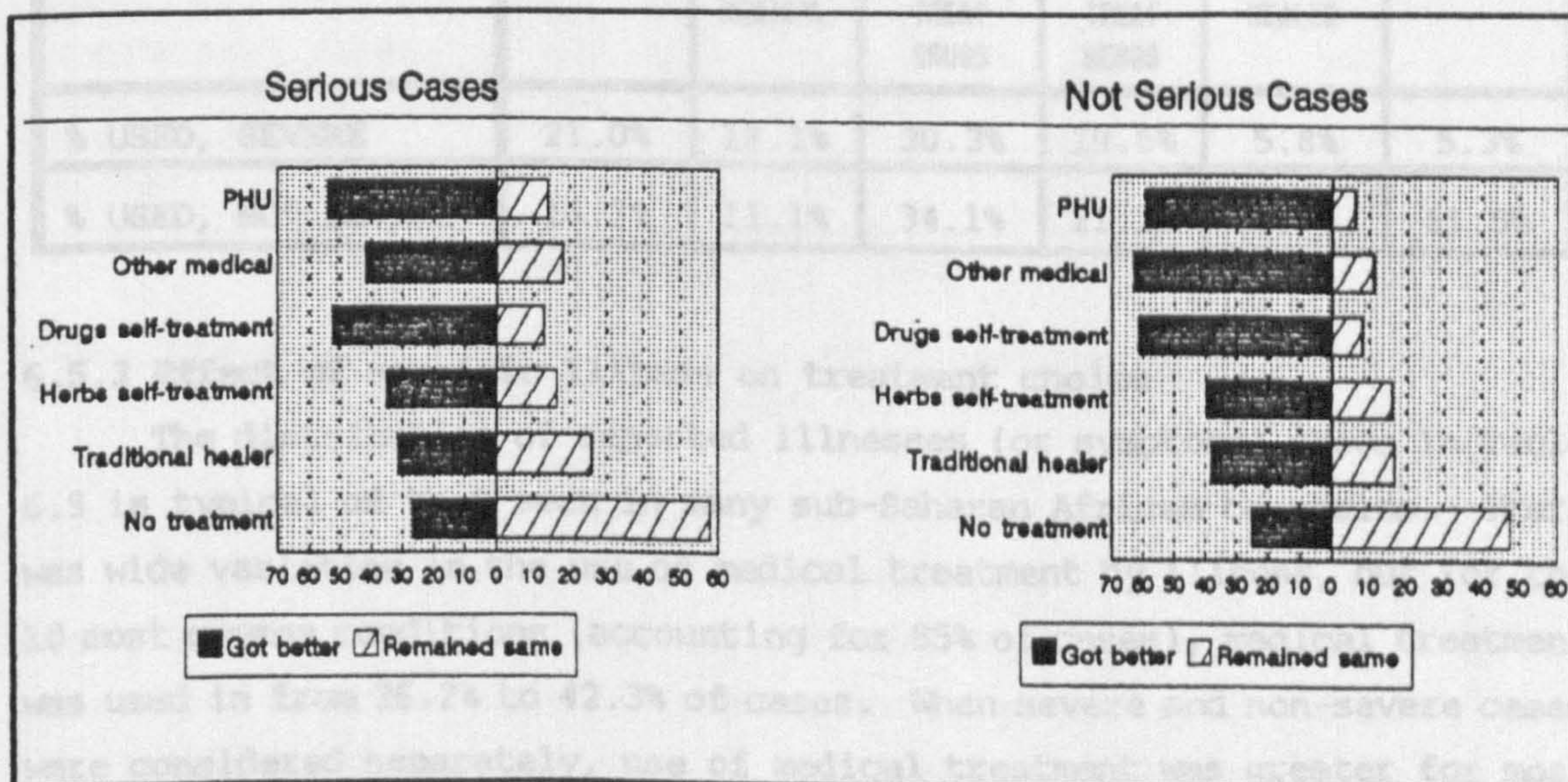


Figure 6.2: Results obtained from treatment of severe and non-severe cases by different treatment options

with medical treatment and self-treatment with drugs than with herbal self-treatment, traditional practitioners, and no treatment. That the perceived results from 'other medical' treatment of severe episodes were not as good as from drugs is undoubtedly due to the self-limiting nature of cases using

the latter (mostly fever, body pains, etc.). This data suggests the relative perceived quality of each treatment alternative for the entire sample or subgroup, but is not statistically useful for comparison of individual illness cases or households, and was not used as a preference variable.

6.5.2 Effect of severity of illness on treatment choice

59.3% of all conditions were described as severe using the criteria already described. Table 6.8 shows that 'other medical' providers (mission hospitals and private practice) and traditional healers were used much more often for severe cases, but the difference was less pronounced for PHU use. These differences were statistically significant ($p < .001$), but if the misclassification error of 3%^(Appendix 3) is taken into account, the only categories likely to be significantly different were 'other medical' and 'no treatment'. Severity was retained as a preference variable.

Table 6.8: Treatment type used vs. reported severity of illness

	PHU	OTHER MEDICAL	SELF-TREAT DRUGS	SELF-TREAT HERBS	TRAD'L HEALER	NONE
% USED, SEVERE	21.0%	18.1%	30.3%	19.5%	5.8%	5.3%
% USED, NOT SEVERE	18.7%	11.1%	34.1%	21.2%	2.9%	11.5%

6.5.3 Effect of specific illness on treatment choice

The distribution of reported illnesses (or symptoms) shown in Table 6.9 is typical of that seen in many sub-Saharan African countries. There was wide variation in the use of medical treatment by illness, but for the 10 most common conditions (accounting for 85% of cases), medical treatment was used in from 26.2% to 42.3% of cases. When severe and non-severe cases were considered separately, use of medical treatment was greater for most types of illness when they were considered severe. The greatest increases in medical use with severity were seen for stomach problems, body pains, and oedema.

Table 6.9: Use of treatment options by illness

(1) REPORTED SYMPTOM	(2) PREVALENCE IN TOTAL SAMPLE % (cases)	(3) PREVALENCE IN TOTAL SAMPLE % (cases)	(4) USING ANY MEDICAL ¹ TREATMENT % =	(5) USING PHU TREATMENT % +	(6) USING OTHER MEDICAL TREATMENT %
FEVER, OTHER MALARIAL SYMPTOMS	21.9	(555)	42.3	26.5	15.9
HEADACHES (NO FEVER)	14.6	(371)	27.0	15.1	11.9
RESPIRATORY SYMPTOMS	8.7	(222)	37.4	21.6	15.8
GENERAL BODY PAINS	8.7	(222)	27.5	16.7	10.8
DIARRHOEAL DISEASES	7.6	(190)	39.5	23.2	16.3
STOMACH PROBLEMS	6.3	(160)	31.9	14.4	17.5
SKIN DISEASES	6.3	(160)	34.4	21.9	12.5
EYE DISEASES	4.2	(107)	26.2	12.1	14.0
SIDE PAIN	3.3	(85)	35.3	15.3	20.0
ACCIDENTS, INJURIES, BURNS	3.3	(83)	34.9	20.5	14.5
OEDEMA	2.8	(71)	36.6	12.7	23.9
CHEST PAIN	2.4	(60)	31.7	18.3	13.3
INTESTINAL WORMS	2.0	(50)	46.0	22.0	24.0
MEASLES, OTHER INFECTIOUS	1.2	(30)	36.7	23.3	13.3
GENITO-URINARY AND S.T.D.	1.2	(30)	60.0	40.0	20.0
TOOTHACHE	1.1	(28)	3.6	3.6	0.0
CARDIOVASCULAR	0.8	(20)	45.0	25.0	20.0
EAR DISEASES	0.7	(19)	36.8	15.8	21.1
HERNIA	0.6	(15)	33.3	6.7	26.7
ANAEMIA	0.4	(9)	44.4	33.3	11.1
COMPLICATIONS OF PREGNANCY	0.3	(7)	71.4	57.1	14.3
CONVULSIONS, EPILEPSY	0.2	(6)	33.3	33.3	0.0
MALNUTRITION	0.2	(5)	80.0	20.0	60.0
ALL OTHERS	1.3	(34)	47.1	20.6	26.5
	100.0	(2539)	(897)	(510)	

¹ Medical treatment = Government or mission hospital, PHU, NCH staff seen privately, or private practice. The percentage using non-medical treatment is equal to (100-column(4))%.

Differences in medical and PHU usage by illness were statistically significant, so this variable was included as a preference proxy in the model. New variables were assigned values proportional to the use of each treatment option for each case of the particular illness, e.g, for all cases of fever ILPHU = 26.5 and ILOTHMED = 15.9.

6.5.4 Effect of age and sex on treatment choice

No statistically significant differences in treatment choice were observed when sex of the ill person was the variable, but age effects were significant. Under-5's comprised 15.5% of the sampled household population but, as seen in Table 6.10, accounted for 20.1% of all reported illness and

32.7% of all PHU visits. Differences were statistically significant ($p < .0001$), so age was retained as a variable.

Table 6.10: Effect of Age on Treatment Choice

Cases % by age group (% by treatment)	PATIENT'S AGE				TREATMENT TOTAL
	UNDER 5	6 TO 9	10 TO 15	> 15	
GOVT PHU	167 32.7 (32.7)	49 16.3 (9.6)	33 17.5 (6.5)	261 16.9 (51.2)	510 (100.0)
OTHER MEDICAL	91 17.8 (23.5)	37 12.3 (9.6)	19 10.1 (4.9)	240 15.6 (62.0)	387 (100.0)
SELF-TREAT	149 29.2 (10.3)	122 40.7 (15.0)	63 33.3 (7.7)	400 31.2 (59.0)	814 (100.0)
SELF-TREAT HERBS	67 13.1 (13.1)	67 22.3 (13.1)	49 25.9 (9.6)	329 21.4 (64.3)	512 (100.0)
TRAD HEALER	16 3.1 (10.4)	8 2.7 (6.0)	7 3.7 (6.0)	86 5.6 (73.5)	117 (100.0)
NONE	20 3.9 (10.0)	17 5.7 (8.6)	18 9.5 (9.0)	144 9.4 (72.4)	199 (100.0)
Age Group Total	100.0%	100.0%	100.0%	100.0%	
Cases Age Group %	510 (20.1)	300 (11.0)	189 (7.4)	1540 (60.7)	

6.5.5 Effect of educational status on treatment choice

Many studies have found an association between the use of western medicine and the educational or literacy status of the household head or mothers. These particular variables were not measured in the household survey because literacy rates in rural areas of Sierra Leone were known to be extremely low. A proxy, the percentage of children of school age who actually attended school, may better represent the 'modern' outlook of the household. This school attendance index was associated positively with the use of PHUs, other medical treatment, and drugs, and negatively with the use of traditional forms of treatment, as shown in Table 6.11. These differences were statistically significant ($p < .0001$). Although the cost of sending a child to school is significant (Le 1000 to Le 2000 per year), the correlation of the index with any income factors was less than 0.100, thus making it a useful independent variable. There was a high level of

school attendance in urban areas, which also had high usage of medical treatment, but when urban areas were excluded from the comparison, the association was nearly as strong.

Table 6.11: Effect of household school attendance on choice of treatment

Cases % using treatment	Relative School Attendance			n
	0	1	2	
GOVT PHU	166 18.9	130 19.6	156 22.2	452 20.2
OTHER MEDICAL	99 11.3	111 16.7	136 19.4	346 15.4
SELF-TREAT DRUGS	248 28.3	214 32.3	251 35.8	713 31.8
SELF-TREAT HERBS	235 26.8	121 18.3	97 13.8	453 20.2
TRAD HEALER	50 5.7	34 5.1	14 2.0	98 4.4
NONE	79 9.0	53 8.0	48 6.8	180 8.0
	100.0%	100.0%	100.0%	
Total Cases % in school group	877 39.1	663 29.6	702 31.3	2242 100.0

* School Attendance Index:

0: No eligible children in school

1: 10% to 67% eligible in school

2: more than 67% eligible in school

6.6 Access Variables

Distances to fixed health facilities and the type of the nearest PHU were retained as access variables on the basis of correlation with the use of medical treatment.

6.6.1 Effect of distance from health facilities on choice of treatment

There was a strong negative relationship between the distance patients had to travel and the utilization rate of fixed health facilities. Figure 6.3, based on reported village-wise walking time to the nearest PHU (excluding BUY chiefdom because of low PHU usage), shows the rapid fall-off of utilization with travel time or distance. A logarithmic regression line fits the data points somewhat better (correlation coefficient = -0.91, R^2

= 0.82) than a linear regression (correlation coefficient = -0.82, R^2 = 0.68). The data points also suggest discontinuities when grouped as in Table 6.12. When the data were plotted on a log-log scale, the slope of the regression line was -0.44, which can be taken as the elasticity of demand with respect to walking time¹. When BUY chiefdom was included there was a similar relationship, but the maximum utilization for the entire sample was only 33% for villages where a PHU was located because of the low utilization rate of MCH units.

Table 6.12: PHU utilization^a versus distance and walking time categories.

PHU utilization by distance		PHU utilization by walking time	
Distance in miles	% using PHU (N)	Walking time, hours one way	% using PHU (N)
0	45.0 (634)	0	45.0 (634)
0.5 to 5.0	23.6 (550)	0.5 to 2.0	22.2 (652)
6.0 to 10	8.2 (512)	2.5 to 4.0	6.6 (410)

^aBUY chiefdom was excluded because of very low PHU utilization.

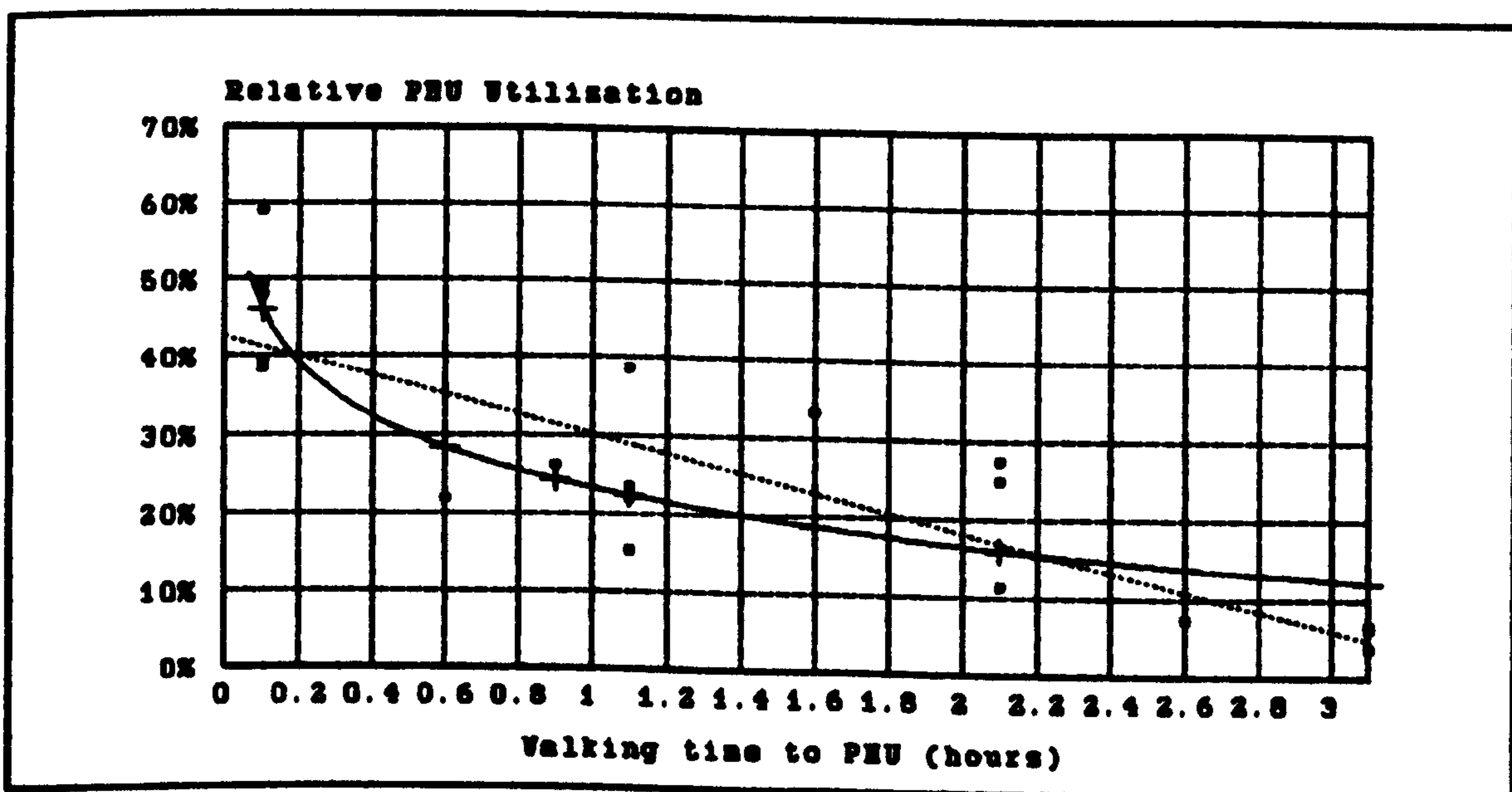


Figure 6.3: PHU utilization vs walking time. The solid curve is the logarithmic regression, dotted is a linear regression.

¹Based on the average agricultural wage rate of about Le 60 per day, the opportunity cost of walking can be taken at about Le 6 per hour.

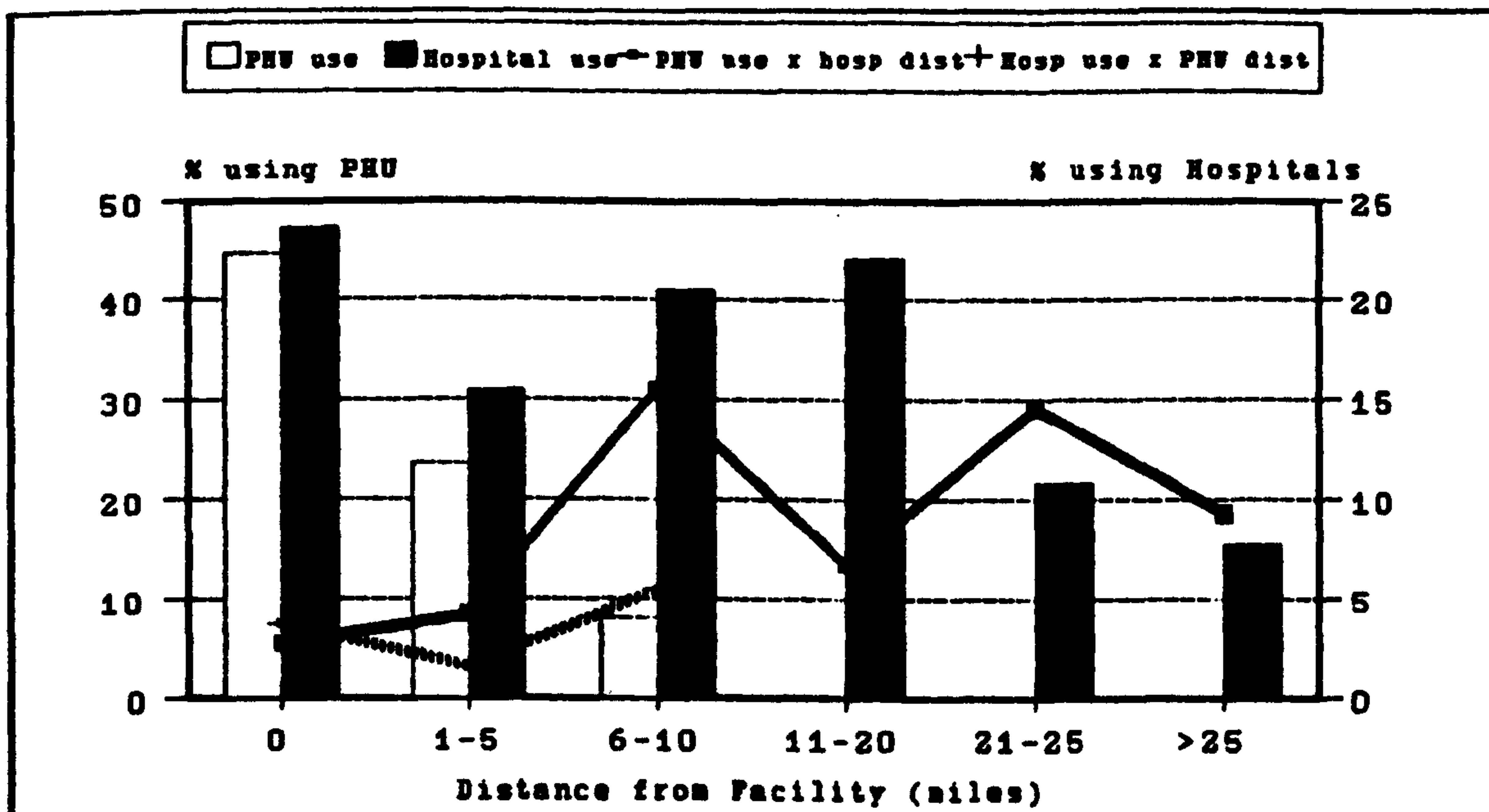


Figure 6.4: Distance and cross-distance effects on PHU and hospital utilization

Figure 6.4 shows the much smaller effect of distance on hospital utilization (dark bars) than on PHUs (light bars), with a steady decrease not evident until beyond 20 miles. Increased distance to hospitals was apparently also associated with greater use of PHUs (solid line), and distance to PHUs was associated with greater use of hospitals (dotted line). Villagers living far from both a PHU and a hospital were apparently more willing to travel to a hospital, (especially a mission hospital where they could be sure of receiving treatment), than to a PHU, where drugs had usually been out of stock in the recent past.

6.6.2 Type of nearest PHU

The observed difference in the maximum utilization rates of the two types of PHUs suggested that the difference in levels of service provided should be taken into account. Community Health Centres and Posts were used by 42.7% of all cases in the village in which they were located, but MCH Posts were used by local villagers in only 8.6% of cases. A dummy variable indicating whether the nearest PHU was a Health Centre/Post or an MCH Post was introduced to account for this quality difference between levels of PHU. This could also be considered a preference variable representing perceived quality but it is probably more meaningful as an access factor, as it interacts with the distance to a source of PHC services.

Summary

Medical treatment was used in only 35% of reported illness cases, with government primary health care units (PHUs) accounting for about half of this. There were large differences between prices paid, and also in the percentage of total health expenditures, for PHU treatment, hospital treatment, and non-medical alternatives. Of those cases using non-medical forms of treatment, over half claimed to have done so because of lack of money. Amounts paid and deterrence both varied significantly by geographic area.

Significant associations with treatment choice were found for age of patient, orientation of the household toward education of children, and the type of illness concerned and the severity of the episode. These were the preference factors used in the conceptual model of treatment choice. Access factors (the distances to PHUs and hospitals, and the grade of service delivered by the nearest PHU) were also strongly associated with the use of medical treatment.

Chapter 7:

Exploring the Influences on Demand for Medical Treatment:

Part B: Effects of Socio-Economic Status on Treatment Choice, Risk of Deterrence, and Risks in Obtaining Payment

7.0 Ability To Pay (ATP) Variables

Socio-economic status (SES) or its proxies (household and per capita income, and assets or other indicators of wealth) are factors by which vertical equity effects are most often compared. Households in the sample were classed into income groups and compared by the choice of treatment and other characteristics. Other factors in the conceptual model were also compared: availability of money at home, the rate of deterrence for financial reasons, and the methods used to obtain the price of treatment if it was not readily available. The relative financial burden of treatment costs was also examined.

7.1 Wealth and income measurement

Given the wide range of prices associated with the different treatment options, it was expected that household income and/or per capita income would play a role in the demand for medical treatment. Because of the difficulty of measuring incomes, proxy variables which represent income are often used instead in rural surveys. These are usually readily discerned factors which are assumed to indicate the wealth of a household, and to be related to current income and ability to pay. Commonly used proxies are ownership of livestock and consumer goods, the type of construction materials used in the house, and expenditures, especially on non-essential consumption. The wealth proxies measured in this household survey are described in the notes to Table 7.2, and descriptive statistics are given in Appendix Table A1.13.

This study attempted to identify the influence of wealth factors separately from income, making it necessary to estimate income separately, from information obtained from respondents. Income from non-farming activities was extrapolated from the reported occupations of the household

head and all other economically active household members (including family members who live elsewhere and remit money) on the basis of typical earnings in the chiefdom or urban area. Income from farming was estimated from reported sales of major cash crops (coffee, cacao, and palm oil), and on the basis of the reported amount of seed planted and average yields and farmgate prices for rice, the major subsistence crop. This method was subject to error due to individual deviations from the average earnings, prices, and yields, but the wide range of the basic factors (economically active members, cash crops sold, rice planted, etc.) found among households implied that the computed incomes would reflect at least a relative ranking of households. The income estimates are shown in Table 7.1.

Table 7.1: Calculated mean annual household income, per capita income, and relative inequality, by geographic area.

Geographic Area	Mean Farm Household Income (Le) (including subsistence)*	Mean Non-Farm Household Income (Le) *	Mean Total Household Income (Le) (inequality)**	Mean Per Capita Total Income (Le) (inequality)**
Full sample	19165	27209	46848 (3.6)	6720 (4.5)
BMK chiefdom	15502	29720	45564 (3.0)	6157 (4.1)
BUY chiefdom	27781	21428	49545 (3.9)	5963 (4.7)
Port Loko district	21641	25574	47554 (3.5)	6060 (4.4)
LAN chiefdom	20254	11695	31698 (3.3)	4606 (4.7)
MAL chiefdom	18927	33320	52768 (3.8)	9090 (5.0)
Kenema district	19725	22507	42233 (3.6)	6848 (4.9)
Urban areas	4839	56972	62877 (2.7)	8913 (3.0)

* 'Totals' do not exactly equal the sum of components because of differences in missing cases.

** Ratio of the lower bound of the highest quintile to the upper bound of the lowest quintile.

7.1.1 Relative income groups

In order to assess differentials within communities and simplify the graphical presentation of the data, households were divided into relative income quintiles based on the income distribution in the each of the five geographic areas studied. As seen in Appendix Table A1.10, this means a group III household in MAL chiefdom might have the same income as a group

IV household in poorer LAN. Actual income rather than groupings were used in the regression analyses described in Chapter 8¹.

7.1.2 Wealth variables

The correlation between most wealth proxies and income on a case-by-case basis was rather low because of high variability, but when households were grouped into income quintiles the household income group correlated well with the means of the wealth variable. The strength of the relationship can be characterized by the correlation coefficient, R^2 , and the slope of the regression line. Figure 7.1 illustrates the relationship

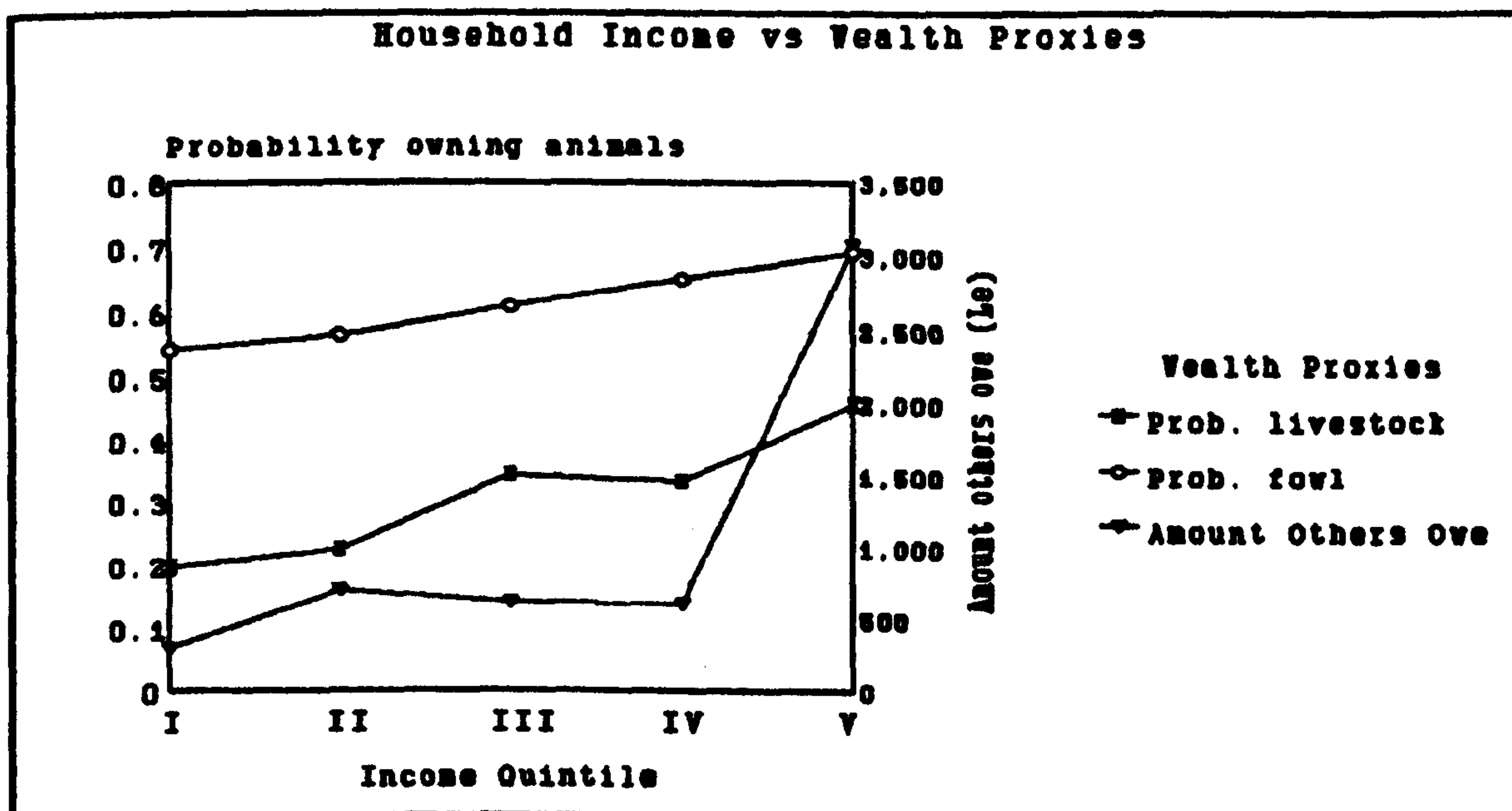


Figure 7.1: Household wealth proxy variables vs. household income group

between household income group and three wealth proxies which show different degrees of correlation and sensitivity (a wealth variable could have high correlation with income but would still not be a useful predictor if it changed only slightly with income, e.g, the probability of owning fowl, which was 0.54 for the lowest income group and 0.69 for the highest). The statistics for all 13 proxies are shown in Table 7.2a.

¹statistical information is not lost when data such as these are broken into groups. According to a statistical consultant, regression coefficients obtained from discrete data and grouped data are nearly equal when there are 5 or more groups.

Table 7.2a: Wealth proxy variables in the household survey and correlations with household income

WEALTH PROXY VARIABLE	Statistical Relationship to Household Income Group		
	Correlation Coefficient	R ²	Relative ^a sensitivity
House size and construction materials	.88	.77	0.04
Interviewers' assessment ^b	.99	.99	0.05
Possessions	.92	.85	0.32
Number meals eaten previous day	.99	.98	0.04
Amount spent on ceremonies ^c	.83	.69	0.42
Amount spent on emergencies ^d	.74	.55	0.25
Food other than starchy staples (per capita) ^e	.89	.80	0.08
Probability of owning livestock ^f	.96	.92	0.18
Probability of owning fowl ^g	.99	.98	0.06
Money and rice owed by others	.76	.58	0.50
Money and rice owed to others	.77	.59	0.30
Money in pocket, dry season ^h	.91	.83	0.27
Money in pocket, rainy season ^h	.88	.77	0.55

Notes to Table 7.2a:

^aThe slope of the regression line divided by the value of the wealth variable at the midpoint of the income scale. For example, the score for house construction increased at a rate of 4% of its quintile III value per income quintile.

^bInterviewers were asked to record their estimate of the household's relative wealth before asking any questions.

^cOnly 28% of households reported ceremonies in the preceding year.

^dBesides illness and accidents, the most common and expensive emergencies were funerals and local court cases, the cost of both being somewhat discretionary.

^eThe advisory committee suggested that while most households consume the same amount of rice per adult, the quality and quantity of ingredients for 'sauce' for the rice increases with income. Wives were asked to detail their previous day's purchases. (This was found not to be true in a national income and expenditure survey (CSO 1988) - these ingredients rise with income at a rate only slightly greater than rice consumption.)

^fNumbers of livestock and fowl were not asked because this was thought to be too sensitive a question, so the questionnaire asked if any were owned.

^gBoth questions were asked in both seasons for the purpose of comparing the responses. This was not originally intended as a wealth proxy variable.

Table 7.2a shows that many of the wealth variables assessed in the household survey had high correlations with household income group. However, this alone is not sufficient to make a wealth proxy a useful predictor of income since the sensitivity of some proxies was quite low, and the actual correlation on a household-by-household basis is also low.

For example, while the average number of meals eaten the previous day and ownership of livestock clearly increase with income (Tables 7.2b and 7.2c), most households in every income group ate 2 meals and most did not own livestock. While the column percentages in Table 7.2c show that the probability that a group I household owned livestock was 19.7% versus 45.5% for a group V household, the row percentages show that the probability of a given livestock-owning household being in the highest income quintile is 28.3%, versus 13.4% of being in the lowest quintile. This low degree of classification power makes the individual proxies inadequate for positively identifying the income group of households.

Table 7.2b: 'Meals eaten' wealth proxy versus household income group (cell entries are numbers of households)

Number meals eaten	I	II	III	IV	V
1	4	2	0	0	0
2	108	92	88	76	55
3	112	116	126	136	147
4	0	0	1	1	1
Mean number meals	1.48	1.59	1.63	1.69	1.78

Table 7.2c: Ownership of livestock versus household income group

Count Row Pct Col Pct	Income Group					Row Total
	I	II	III	IV	V	
Does not own any livestock	188 24.4 80.3	169 22.0 77.5	146 19.0 65.8	150 19.5 66.7	116 15.1 54.5	769 69.2
Ows livestock	46 13.4 19.7	49 14.3 22.5	76 22.2 34.2	75 21.9 33.3	97 28.3 45.5	343 30.8
Column Total	234 21.0	218 19.6	222 20.0	225 20.2	213 19.2	1112 100.0

Classification power is increased by combining several proxies. Four proxies having high correlation with household income for which there were no missing values (house construction, livestock ownership, meals eaten, and possessions) were combined in a way which might be used in means-testing: partial scores of 0 and 1 were assigned if the proxy value was below or above the mean. Households with a total score of zero were then compared with those having a (maximum) score of 4. 46.3% of high scorers

were in income group V and 68.3% were in either groups IV or V. 38.5% of low scorers were in income group I and 66.7% were in either groups I or II. The probabilities of correctly identifying the poor or the rich through this combination of wealth proxies was therefore 1.5 to 2 times better than a random guess (i.e., 20% for one income group or 40% for two groups).

7.1.3 Cross-checks of income estimates

The credibility of the income rankings is enhanced by the high correlation of the 13 different wealth proxies with household income group (the average correlation was 0.885, $R^2 = 0.792$). The association of per capita income with wealth proxies was not nearly as strong, with a average correlation coefficient of 0.545, and R^2 of 0.475.

The income calculations were conservative in that some sources of cash or kind income may have been consistently excluded or underestimated. The calculated incomes shown in Table 7.1 result in average per capita income for the sample of only \$103 (using the prevailing official exchange at the time of the survey of \$US 1 = 65 leones) compared with the official per capita GNP of \$210 (which however includes the capital Freetown). The income estimates were compared with results of an extensive national household income and expenditure survey (NHIES) conducted over the period November 1989 to October 1990 by the Central Statistics Office of Sierra Leone. Referring to the expenditure data (usually assumed to be more reliable than income data) for the rural areas in Appendix Table A1.9, the two surveys agree that household incomes in the urban areas are highest, followed by rural Port Loko district, with rural Kenema district last. After correcting for different ways of calculating mean per capita income, the NHIES data showed per capita income in Port Loko higher than Kenema, while this survey found the reverse. The differences were small though, and the relative incomes for the rural and urban samples were nearly equal in both surveys, providing further confidence in the ranking ability of the present survey.

The distributions of household and per capita incomes are skewed downward, with the skewness varying somewhat between geographical areas, as indicated by the measure of inequality in Table 7.1 which compares the mean income of highest and lowest quintiles. Referring to Appendix Table

A1.10, this means that (for example) while mean household income in MAL is considerably higher than in BMK, 20% of households in both chiefdoms have incomes below Le 20000.

The most important difference between the results of the two surveys is in the absolute magnitude of incomes in leones, with the NHIES figures about 5 times those of the present survey. Since the NHIES collected data over the period of nearly a year during a time of nearly 100% annual inflation, presumably all income and expenditures were standardized to one point in time, but details of the methodology used were not available. The NHIES data fit the official per capita GNP figure of \$210 if an exchange rate of \$US1 = Le 130 is applied, a rate which would have been in use in mid-1990. By comparison, this survey's data fit the official GNP at an exchange rate of \$US1 = Le 29.5, compared to the rate of 65 when the survey was conducted. This latter difference (a factor of 2.2) represents the degree to which this study probably underestimates incomes. As mentioned, there is reason to believe the estimates accurately represent relative income, and a correction of 2.2x will be applied where absolute income measures are needed, as in the calculation of health expenditure as a percentage of income. The form of income most likely to have been missed in the rural areas would have been occasional sales of garden produce. It is also possible that rice yields from swamp farms, and income from large and petty trading were consistently underestimated.

The differences found between geographic areas appear reasonable, reflecting the larger size of rice farms in BUY and the cash crops and diamond mining in MAL. In the rural areas non-farm (cash) income comprised from 34% to 63% of total household income. LAN appears to be the poorest chiefdom, and there were also statistically significant income differences between villages. Some of the inter-chiefdom differences seen could have been due to village-level sampling bias (from the relationship between village size and non-farm income), but income differences between chiefdoms remained significant when village population was controlled for.

7.1.4 Poverty and equality

The overall rural income distribution (Appendix Figure A1.1) shows that the relative income share of the poorest two quintiles is about 15%.

There are no comparable data available for only rural areas in sub-Saharan Africa, but this figure represents a level of inequality less than that found in many developing countries (rural and urban combined), and is in the range of some industrialized countries. (If Freetown had been included, however, it is likely that the overall figure would be lower). This relative lack of inequality manifests itself in the appearance of the villages, houses, and people, and other indicators of wealth.

7.1.5 Income variation with rural location

Villages with PHUs in them (usually the chiefdom's market towns) had somewhat higher mean household incomes than those in their immediate 5-mile radius, probably due to the greater level of economic activity. Sampled villages which were between 5 and 10 miles away had still lower incomes in BMK and LAN, but in BUY and MAL they were higher. This was a confounding factor which had to be controlled for in the analyses. The mean household incomes for all chiefdoms were: PHU villages: Le 48205; 0.5 to 5 miles from a PHU: Le 40417; 5 to 10 miles from a PHU: Le 46505.

7.1.6 Total household income versus per capita income

The influence of both total household income and income per capita was examined in this analysis. It is generally accepted that per capita income is the better overall measure of welfare since it is directly related to individual consumption (most directly to per capita food consumption) and therefore to nutritional and health status. However, it might also be that high aggregate resources of the household enable it to withstand economic stresses, and this may be particularly true in the case of illness: if one household member falls ill the absence from work is less likely to have a serious effect on a large household than on a small one, and the resources of several earners can be pooled to pay for treatment. It was also shown that household wealth measures correlate better with total income than with per capita income. If high per capita income and high total income do not always coincide, it would seem an open question as to which is more advantageous when it comes to being able to pay for medical treatment.

The distributions of total household income and per capita income between geographical areas differ mainly because of differences in average

household size (Appendix Table A1.11). In contrast to the findings of Hill (1977) in Nigeria, large households in Sierra Leone are apparently not usually better off than small ones in terms of per capita income. As seen in Figure 7.2, farming income varied directly with household size but income from non-farming activities remained nearly constant. This may reflect a reality of rural life, that true self-subsistence is very hard to achieve (only 9.2% of rice-farming households never had to buy rice; half bought rice 5 or more months out of the year), so most households find other sources of income first and then farm as they are able to. As a household increases in size with the birth of children and the addition of

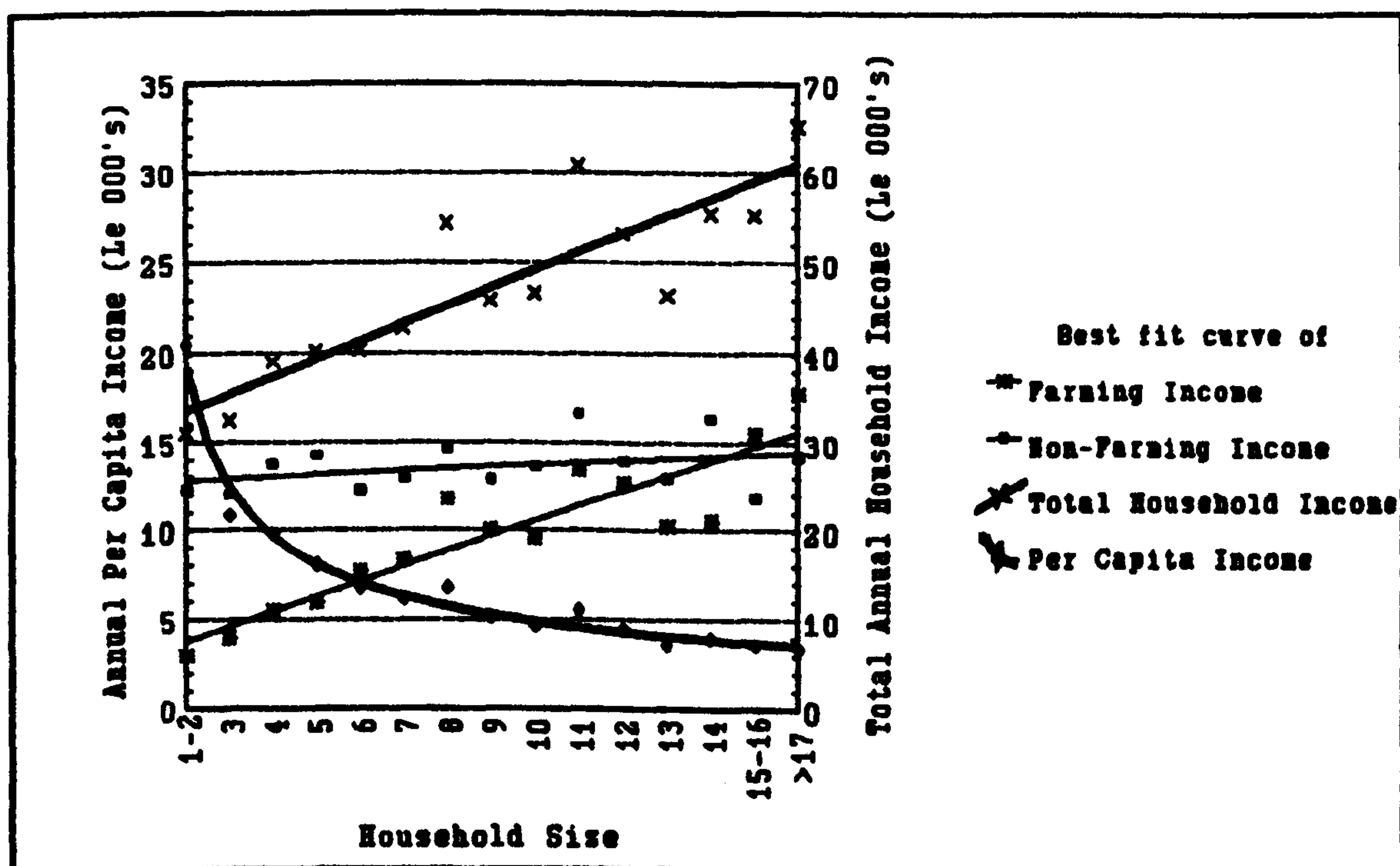


Figure 7.2: Total household income and per capita income vs. household size

wives and children-in-law, most of the additional labour is apparently applied to farming. But while larger households were often poorer, smaller households in rural Sierra Leone were found to be more vulnerable to pre-harvest hunger by Richards (1986) because lack of 'in-house' labour restricts scope for recovery from random shocks such as illness or weather conditions.

7.2 'Medical Need': Morbidity and mortality risks by income group

The risk of illness and death in the sample population decreased steadily with household income (Figure 7.3), but the relationship with per capita income (Figure 7.4) was less clear. The increased mortality rate for the highest per capita income group was due to a high proportion of deaths in children under 5, while the higher rate of non-severe illness in this group was found disproportionately in adults. Since a high proportion of high per-capita income households were smaller than average, it may be that children are cared for less well in smaller households. Smaller households also had a higher proportion of older adults, who suffer many minor aches and pains. Table 7.3 presents the morbidity rates in terms of the number of ill per household, showing that low total income households, which have fewer household members, have nearly as many illness cases as larger, higher income households in absolute terms, and thus have higher morbidity per household member.

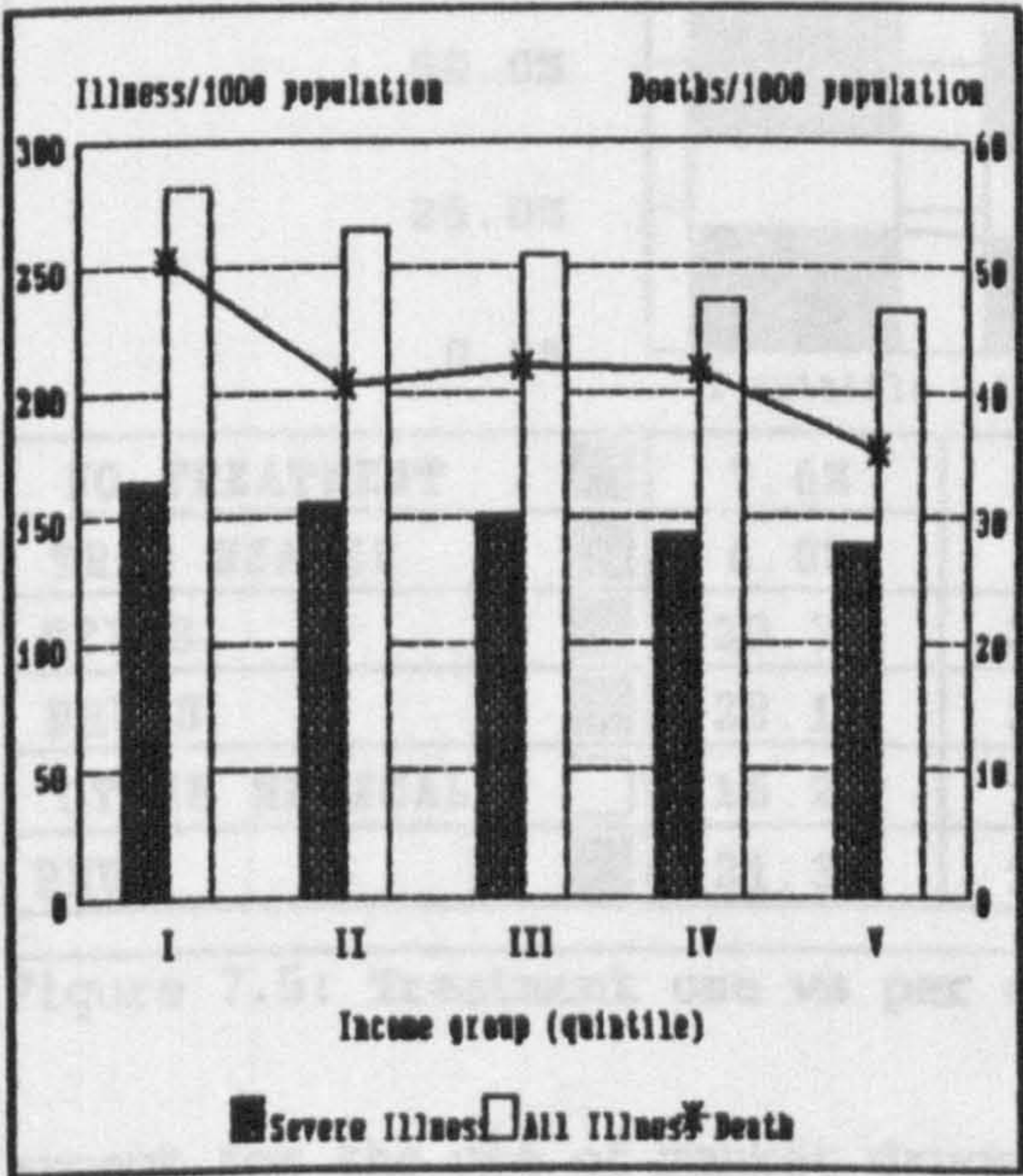


Figure 7.3: Morbidity and mortality rates by household income group

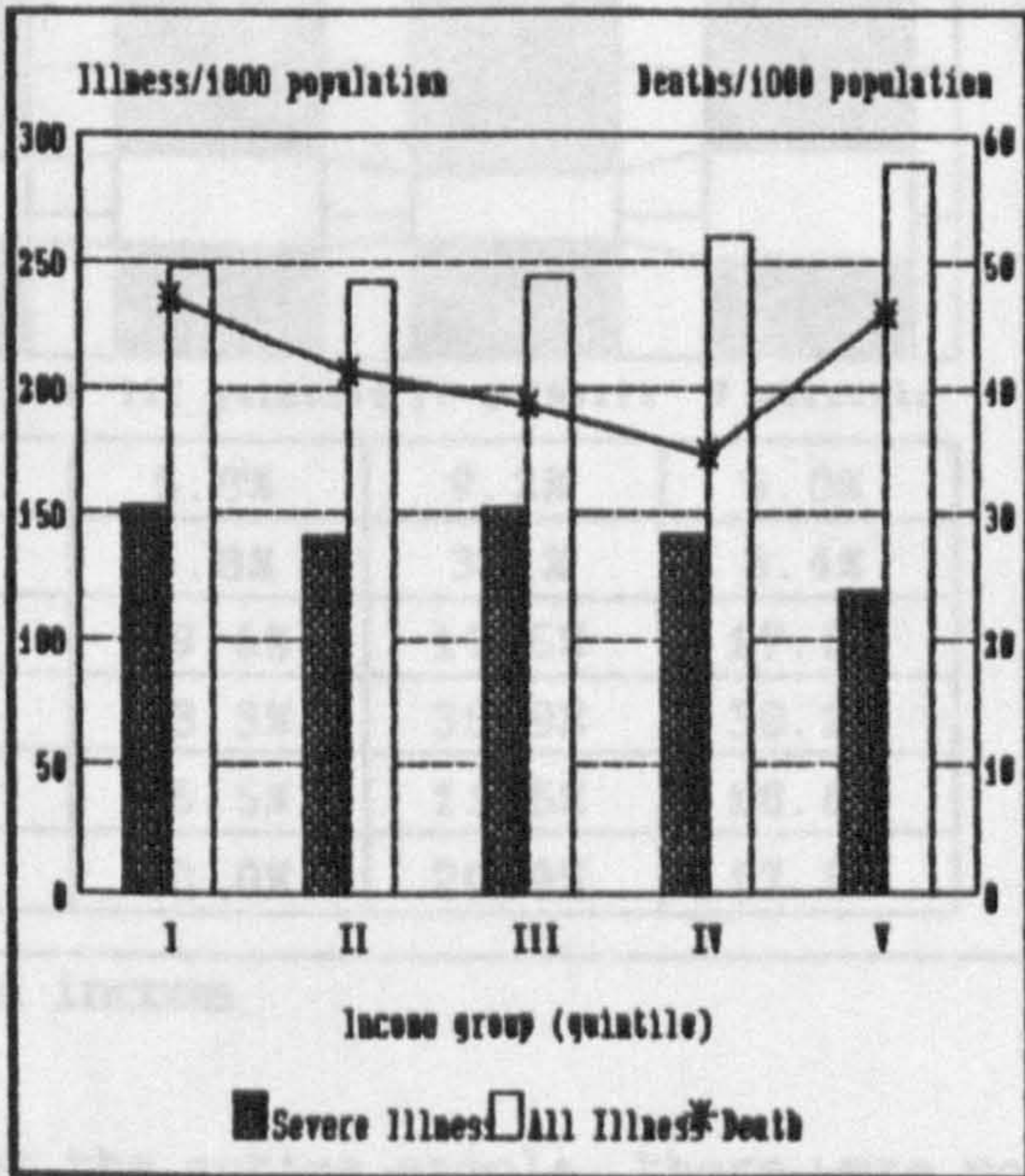


Figure 7.4: Morbidity and mortality rates by per capita income group

Table 7.3: Household illness rates by household income group

	Household Income Quintile				
	I	II	III	IV	V
Mean illnesses per household	2.12	2.24	2.17	2.18	2.41
Mean household size	7.52	8.45	8.54	9.24	10.35
Illnesses per household member	0.32	0.30	0.27	0.26	0.27

7.3 Ability To Pay: Effect of income on use of medical treatment

No consistent relationship was seen between treatment choice and either household or per capita income, as seen in Figures 7.5 and 7.6,

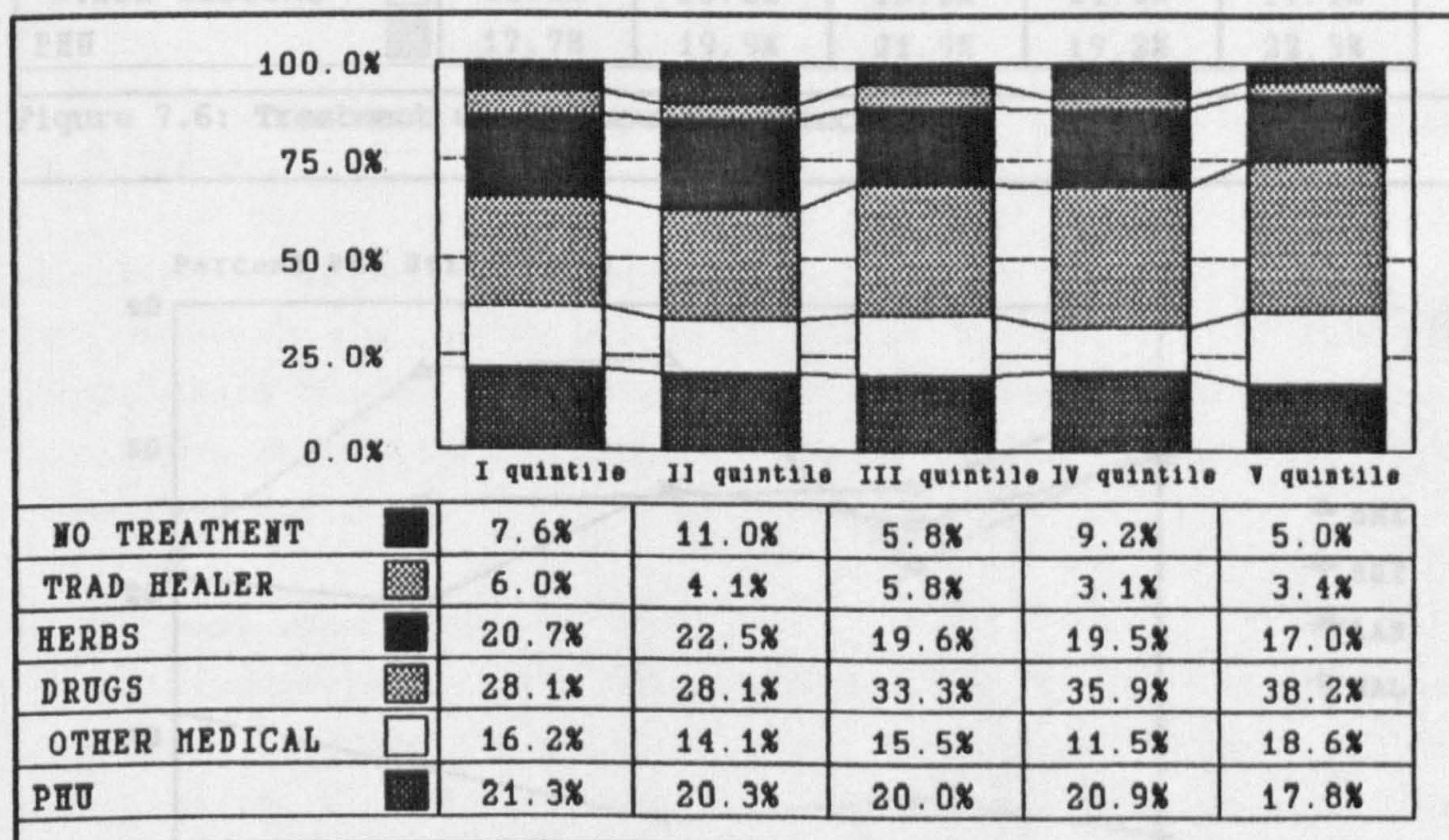


Figure 7.5: Treatment use vs per capita income

except for the use of market drugs. For the entire sample, there were no significant differences in PHU utilization by household income or by per capita income. By geographic areas, only the two Kenema chiefdoms showed well-defined increases in PHU utilization with household income (but not with per capita income), as seen in Figures 7.7 and 7.8. The statistics for the ordinary least squares (OLS) regressions in the latter graph indicate no relationship between PHU use and household income in BMK, a negative one in BUY, and positive ones in LAN and KEN. While the relationship in LAN was somewhat stronger, the rate of increase was still

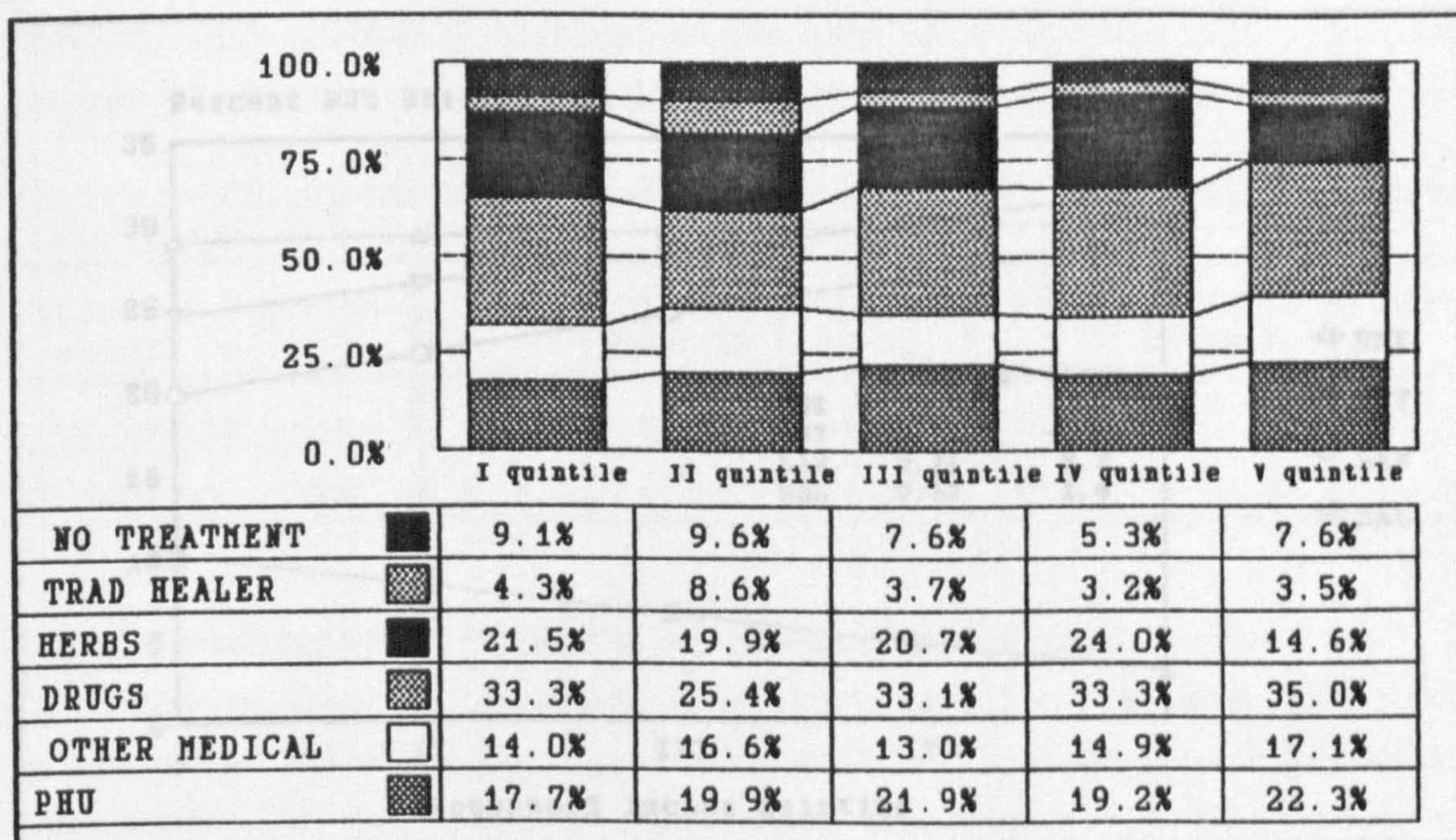


Figure 7.6: Treatment use vs household income

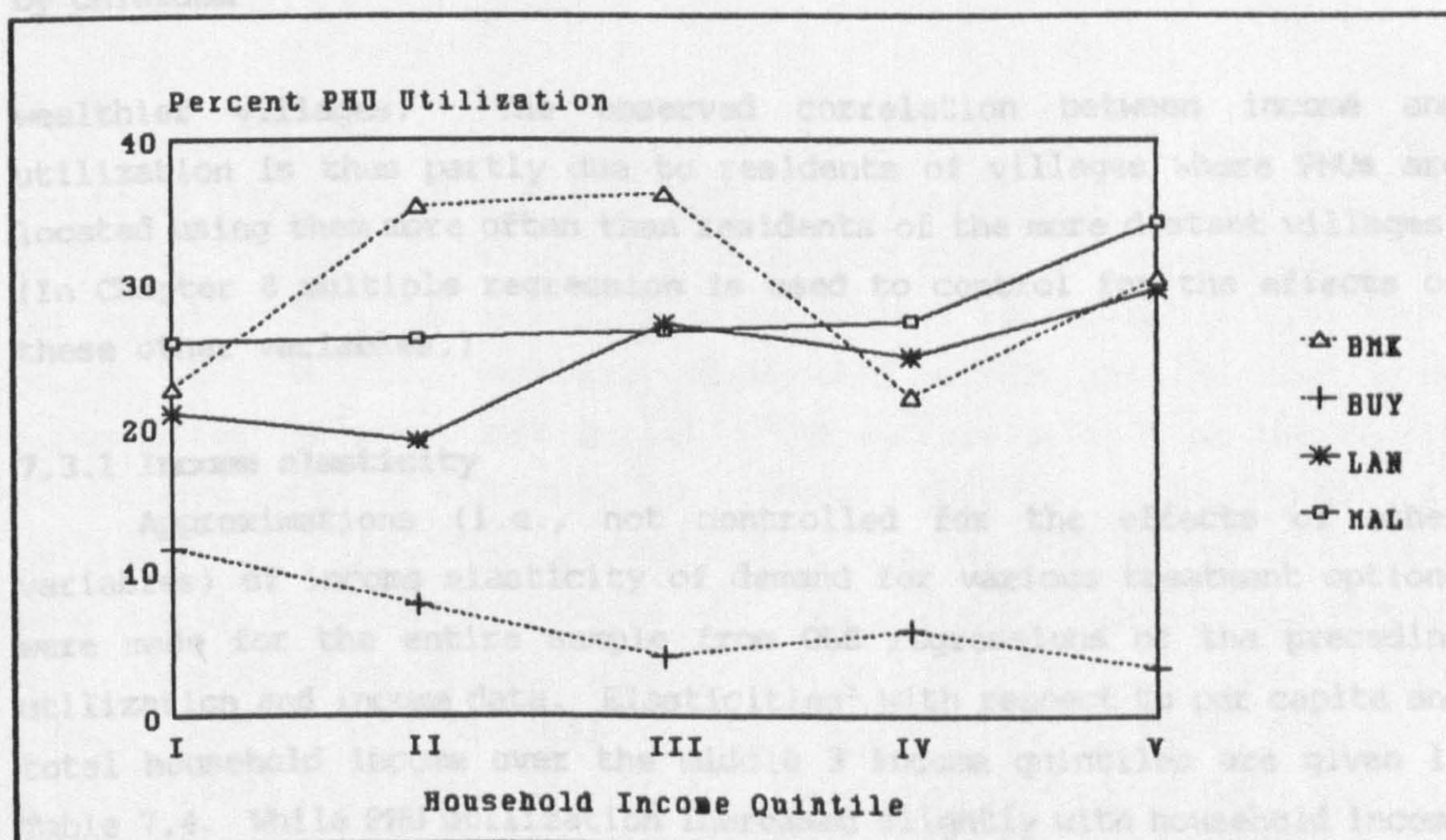


Figure 7.7: PHU utilization by household income group, for different chiefdoms

only 2.3% per income quintile. The negative relationship in BUY was probably due to the low quality of PHU services there and good access to a mission hospital. Part of the difference between districts is due to a stronger (negative) correlation in Kenema district (LAN and MAL chiefdoms) between income and distance from the PHUs, which are sited in larger,

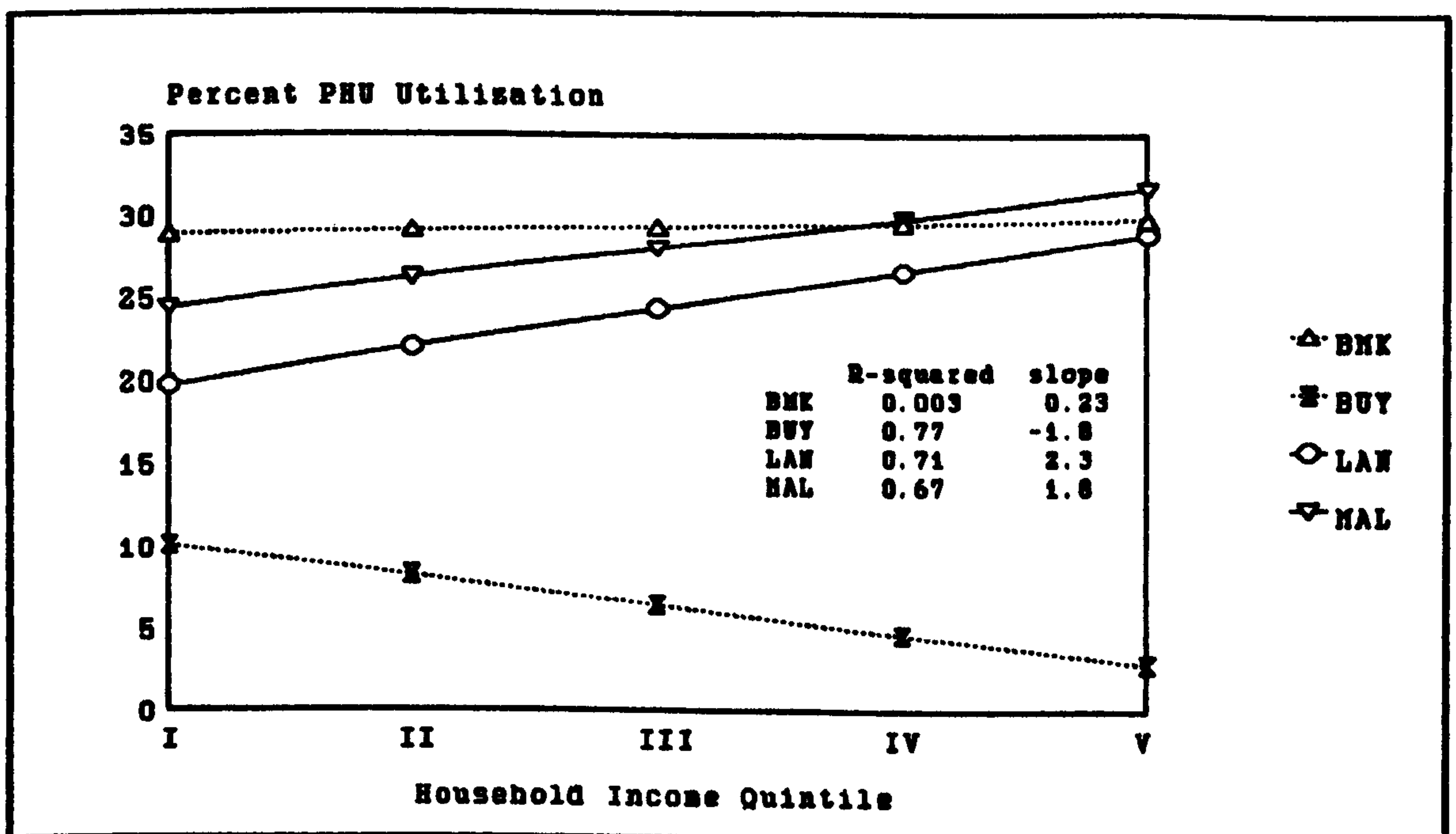


Figure 7.8: OLS regressions of PHU utilization with household income group, by chiefdom

wealthier villages. The observed correlation between income and utilization is thus partly due to residents of villages where PHUs are located using them more often than residents of the more distant villages. (In Chapter 8 multiple regression is used to control for the effects of these other variables.)

7.3.1 Income elasticity

Approximations (i.e., not controlled for the effects of other variables) of income elasticity of demand for various treatment options were made for the entire sample from OLS regressions of the preceding utilization and income data. Elasticities¹ with respect to per capita and total household income over the middle 3 income quintiles are given in Table 7.4. While PHU utilization increased slightly with household income (averaging the effects seen in the different geographic areas), the regressions also indicated that PHU utilization decreased with per capita income. This seeming contradiction is merely a consequence of the fact that high household income is associated with larger households, which tend to have lower per capita incomes. The opposite was observed for drugs,

¹Approximated by the relative change in utilization divided by the relative change in income.

however, with greater (positive) elasticity found for per capita income. Income effects are determined with more precision in Chapter 8.

Table 7.4: Calculated income elasticity of demand for different treatments (over quintiles 2-4).

Elasticities with respect to:	PHU	OTHER MEDICAL	MARKET DRUGS	HERBS	TRAD'L HEALER	NONE
Per Capita Income	-0.10	+0.01	+0.18	-0.08	-0.23	-0.14
Household Income	+0.12	+0.08	+0.05	-0.14	-0.36	-0.22

7.3.2 Expenditure on treatments as a proportion of total income

Amounts spent on treatments used in the recall period were aggregated by household and multiplied by 26 to obtain the average annual household expenditures on treatment. These were expressed as a percentage of household income (multiplied by the correction factor 2.2, as discussed earlier).

Compared with the 2.5% to 3.0% found for low and medium income countries (Shepard and Benjamin 1988), the resulting overall average of 6.9% (c.i. = 5.5% - 8.3%) of total household income is somewhat high for the region. This percentage could be subject to errors in estimating income, and is also extremely dependent on the precise recall of expenditures in a two-week period. The extrapolation from the recall period also makes no allowance for seasonal variations in morbidity. It is likely that biases were random however, so, as with income estimates, this survey should have produced at least reliable relative expenditure data. The NHIES found that expenditures on health over the year of that survey averaged 4.5% of total household expenditure in rural Kenema and 2.0% in rural Port Loko, lower² than the figures shown in Table 7.5 for the four rural chiefdoms, but in the same relative order.

Table 7.5 shows variations between geographic areas and Table 7.6 shows the same data broken down by household income groups. The breakdown by geographic area reflects differences in utilization patterns and local treatment costs. As shown in Table 6.6, expenditures on 'other medical'

²It is of course also possible that health expenditures were underestimated in the NHIES.

treatments dominated the average household's health budget at 62.1%, but important differences were seen (Table 7.5, lines 5,7, and 9) as between the two Port Loko chiefdoms, where the proportion of income spent on treatment in BUY is nearly twice that of BMK due to high use of more expensive providers. The low proportion spent on treatment in BMK and urban areas is also noteworthy.

In contrast to the large differences between geographical areas in the allocation of household health budgets, Table 7.6 shows greater similarity between income groups (lines 4,6, and 8). This is due in part to the higher specific morbidity rate of poorer households (seen in Table 7.3). Since poorer households used medical treatment almost as frequently as wealthy ones¹, the nearly equal number of illness episodes per household results in high percentages of income spent on treatment (line 3 of Table 7.6).

Table 7.5: Expenditure on different treatments as percentage of income and total health expenditures, by geographic area

		Geographic Area				
		MEANS	BMK	BUY	LAN	MAL
1) Mean annual household income (Le)	103070	100240	109000	69736	116090	138330
2) Mean amount spent on all treatments in recall period (Le observed)	275.3	133.0	280.4	250.4	474.0	151.1
3) Treatments as % of income	6.9%	3.5%	6.7%	9.3%	10.63%	2.0%
4) PHU expenditures as % of all treatments	20.7%	53.7%	3.7%	26.5%	22.3%	5.9%
5) PHU expenditures as % of total income	1.4%	1.9%	0.3%	2.5%	2.4%	0.2%
6) 'Other medical' as % of all treatments	62.1%	14.1%	77.2%	45.5%	70.1%	76.3%
7) 'Other medical' as % of total income	4.3%	0.5%	5.2%	4.2%	7.5%	2.2%
8) Drugs expenditures as % of all treatments	12.1%	16.9%	18.0%	16.6%	5.4%	13.8%
9) Drugs expenditures as % of total income	0.8%	0.6%	1.2%	1.6%	0.6%	0.4%
10) One PHU visit as % of total income	0.13%	0.13%	0.08%	0.17%	0.18%	0.07%
11) One 'other medical' visit as % of total income	0.41%	0.24%	0.40%	0.60%	0.52%	0.12%
12) One drug purchase as % of household income	0.03%	0.05%	0.06%	0.08%	0.04%	0.04%

¹They only did so in LAN, the poorest chiefdom. The opposite situation existed in MAL, the richest chiefdom, with the poor spending more than the rich.

Table 7.6: Expenditure on different treatments as percentage of income and total health expenditures, by household income group

	MEANS	Household Income Group				
		I	II	III	IV	V
1) Mean annual household income (Le)	103070	25450	57100	80400	114700	246000
2) Mean amount spent on all treatments in recall period (Le observed)	275.3	250.2	288.4	278.7	211.4	353.5
3) Treatments as % of income	6.9%	25.6%	13.1%	9.0%	4.8%	3.7%
4) PHU expenditures as % of all treatments	20.7%	18.9%	25.1%	20.3%	24.8%	17.4%
5) PHU expenditures as % of total income	1.4%	4.8%	3.3%	1.8%	1.2%	0.6%
6) 'Other medical' as % of all treatments	62.1%	63.1%	62.1%	61.7%	50.1%	63.4%
7) 'Other medical' as % of total income	4.3%	16.1%	8.1%	5.6%	2.4%	2.3%
8) Drugs expenditures as % of all treatments	12.1%	12.0%	7.6%	11.9%	17.6%	13.4%
9) Drugs expenditures as % of total income	0.8%	3.1%	1.0%	1.1%	0.8%	0.5%
10) One PHU visit as % of total income	0.13%	0.54%	0.29%	0.15%	0.10%	0.05%
11) One 'other medical' visit as % of total income	0.41%	1.68%	0.75%	0.46%	0.27%	0.22%
12) One drug purchase as % of total income	0.05%	0.18%	0.06%	0.05%	0.04%	0.03%

Table 7.7 shows percentages of income spent on treatment by geographic area and household income group. The exceptionally high percentage for quintile I in MAL is a result of the highest aggregate expenditure of any group (Le 739 in the recall period, or Le 19214 per year) and a corrected mean income of only Le 25100. The average cost reported for PHU visits was slightly higher than for other income groups, and this group also had several expensive hospital treatments.

Table 7.7: Percentage of income spent on treatment by income group and geographic area

Geographic Area	Household Income Quintile				
	I	II	III	IV	V
BKK	12.5%	9.1%	7.7%	2.7%	1.3%
BUY	23.9%	17.2%	15.9%	5.5%	4.6%
LAM	21.6%	16.6%	7.9%	10.4%	7.5%
MAL	76.5%	25.3%	15.3%	6.4%	5.5%
URB	11.9%	3.3%	4.2%	3.0%	2.2%

7.4 Effect of local PHU treatment prices

Determining the relative importance of utilization factors from the dataset was complicated by the fact that the official drug markup schedule was not always followed and prescribing practices differed, so not only did individuals pay different amounts for the same treatment in different PHUs, but average prices varied with the geographic area. Fixed official prices for drugs were not adhered to, with prices paid suggesting that PHU staff raised the unofficial markup to correspond approximately to local income levels. The data (Table 7.8, light areas) suggest some relationship between local mean prices and incomes in the 3 rural areas where PHC services were widely available and of approximately equal quality, but do not demonstrate that PHU utilization is necessarily higher when the price is cheap with respect to income. Other factors almost certainly affect the decision more than price, e.g., in the case of BUY chiefdom, where utilization was low because most PHUs offered few curative services and drugs. Since local price level did not appear to affect utilization it was not used as an independent variable. However, the PHU utilization data discussed in section 7.3 does suggest a possible relationship between the price-income ratio and the income elasticity for PHU utilization: there was no effect of income where the price of a visit was 0.13% of income (BMK), a negative effect (i.e., PHU treatment was an 'inferior' good) where the price was 0.08% of income (but services were very limited), but there were apparent positive effects in LAN and MAL, where the price of a visit cost 0.17% and 0.18% of income. While this suggests that the price in Kenema district exceeded a threshold at which demand started to become income-elastic, this should be taken as only a rough indication since other variables have not been controlled for.

Table 7.8: Local PHU price levels vs incomes and PHU utilization

	BMK	BUY	LAN	MAL	URB
Mean PHU visit cost (Le)	131	87	120	212	91
Mean household income(Le) ¹	100240	109000	69736	116090	138330
PHU price/income	0.13%	0.08%	0.17%	0.18%	0.07%
PHU utilization	29.0%	6.5%	24.4%	28.2%	5.6%

¹These income figures have been corrected upward from the estimates by a factor of 2.2

7.5 Effect of income on deterrence from medical treatment

In the preceding chapter it was seen that 'not enough money' was given most frequently as the reason for not using medical treatment. Not having enough money and not using medical treatment were both associated with low per capita and low household income. The bottom lines of Tables 7.9a and 7.9b show that this results in a 'financial' deterrence rate for the lowest household income group that is about a third greater than that of the highest group, although the wide confidence intervals due to misclassification error reduce the significance of the difference. The 3 lowest household income quintiles have higher deterrence rates than the 2 highest quintiles, by 34.2% to 27.4%. This is a differential of nearly 25% greater deterrence for the lowest 3 quintiles, again reduced somewhat by allowance for measurement error.

When morbidity differentials are taken into account, differences in financial deterrence between income groups are magnified, especially for the household income groups, as shown in Table 7.10b. The overall effect of higher financial deterrence and higher medical need is that, compared to the highest household income group the members of the lowest income households are 1.6 to 1.7 times as likely to use non-medical treatment because not enough money was available. Again, there was a sharp difference between the three lowest and the two highest income groups, with the lower three quintiles having specific deterrence rates about 40% higher. Again, the wider confidence intervals lower the statistically significant differences to perhaps half of these levels.

Table 7.9a: Percentage of cases deterred, by per capita income group

	Per Capita Income Quintile				
	I	II	III	IV	V
USED NON-MEDICAL TREATMENT (A)	62.5%	65.6%	64.5%	67.6%	63.6%
REASON: NOT ENOUGH MONEY ^a (B)	53.2%	50.5%	45.1%	48.6%	42.5%
% OF CASES DETERRED FROM MEDICAL TREATMENT BECAUSE OF LACK OF MONEY (A x B)	33.2%	33.1%	29.1%	32.8%	27.0%

Table 7.9b: Percentage of cases deterred, by household income group

	Household Income Quintile				
	I	II	III	IV	V
USED NON-MEDICAL TREATMENT (A)	68.3%	63.5%	65.1%	65.9%	60.6%
REASON: NOT ENOUGH MONEY ^a (B)	50.9%	49.2%	56.1%	46.5%	40.0%
% OF CASES DETERRED FROM MEDICAL TREATMENT BECAUSE OF LACK OF MONEY (A x B)	34.8%	31.2%	36.5%	30.6%	24.2%

^aCorrected rate. When uncorrected rates were used the deterrence rates were higher overall, but the relationship between groups was the same.

Table 7.10a: Percent of population deterred for financial reasons, by per capita income group

	Per Capita Income Quintile				
	I	II	III	IV	V
CASES DETERRED (Table 7.8a) (A)	33.2%	33.1%	29.1%	32.8%	27.0%
ALL MORBIDITY/1000 pop. (B)	248	242	244	260	288
SEVERE MORBIDITY/1000 pop. (B')	153	141	152	142	120
% OF POPULATION DETERRED FOR FINANC. REASONS: ALL ILLNESS (A x B)	8.2%	8.0%	7.1%	8.5%	7.8%
% OF POPULATION DETERRED FOR FINANC. REASONS: SEVERE ILLNESS (A x B')	5.1%	4.7%	4.4%	4.7%	3.2%

Table 7.10b: Percent of population deterred for financial reasons, by household income group

	Household Income Quintile				
	I	II	III	IV	V
CASES DETERRED (Table 7.8b) (A)	34.8%	31.2%	36.6%	30.6%	24.2%
ALL MORBIDITY/1000 pop. (B)	282	265	255	237	233
SEVERE MORBIDITY/1000 pop. (B')	165	156	151	144	140
% OF POPULATION DETERRED FOR FINANC. REASONS: ALL ILLNESS (A x B)	9.8%	8.3%	9.3%	7.3%	5.6%
% OF POPULATION DETERRED FOR FINANC. REASONS: SEVERE ILLNESS (A x B')	5.7%	4.9%	5.5%	4.4%	3.4%

7.6 Availability of money in the household

Respondents were asked if the money paid in connection with any treatment used was on hand in the household, and if not, how it was obtained. Table 7.11 shows that for the 1579 first actions taken where some amount was paid, 65.8% had the money on hand at home. The levels were lower for PHU treatments only, but for both classifications the variations among geographic areas closely reflect mean household income.

Table 7.11: Availability of money at home (first actions) by geographic area

Geographic Area						
% cases in which money was available:	BMK	BUY	LAN	MAL	URB	ALL
All Treatments	61.7%	70.0%	56.1%	69.1%	84.8%	65.8%
PHU Treatment	49.7%	67.4%	49.6%	56.2%	90.0%	53.9%

7.6.1 Availability versus amount paid

Availability of money at home was related to the amount paid, as shown in Figure 7.9. Over 80% of households had the lowest amounts paid available in the household, but for the highest amounts only about 40% had the money available. The data points suggest a discontinuity near 100

leones, but there is also a fairly smooth inverse logarithmic relationship between availability of money at home and the amount paid, with each 100% increase in amount paid resulting in a 6% decrease in availability.

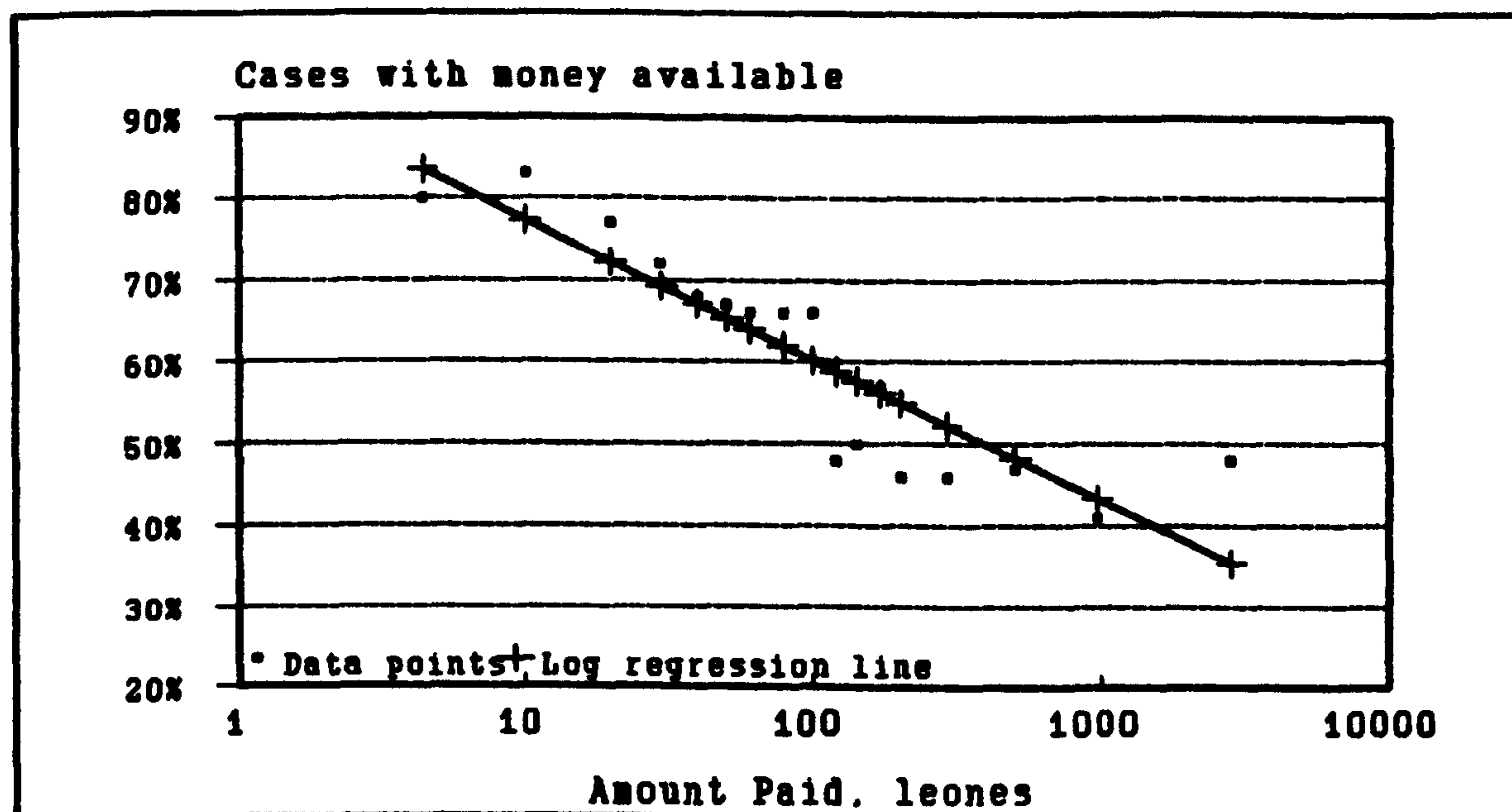


Figure 7.9: Availability of money at home vs amount paid. The regression line can be expressed as: $p = 0.95 - 0.173 \log_{10} P$, where p is the probability of having the amount P on hand.

7.6.2 Availability as a determinant of treatment choice

Due to the way the question about availability of money was asked ("was the amount actually paid for treatment available at home?", rather than, "was enough money for treatment available at home?"), the results (Table 7.12) do not unambiguously reveal the extent to which non-availability actually deterred people from using medical treatment. Figure 7.10 presents the data in a way that shows that when money was available, 44.7% (495/1107) of cases used medical treatment. When money was not available, 540 out of 1432, or 37.7%, managed to obtain some amount of money. 27.7% (397/1432) of those not having money available at home used medical treatment (17% of these paid nothing, having received an exemption or credit). This implies a significant deterrent effect when compared to the 44.7% of cases in which money was available. The only condition under which this would not be true is if many of those who did not obtain money (group C in Figure 7.10) had decided to use non-medical treatment because of preference or access, but 60.5% in this group gave lack of money as the reason. 63.5% of group B also gave this reason, apparently not having been able to obtain the full amount they expected medical treatment would cost.

Of those who had money available and used non-medical treatment (group A), 47% said it was because of not having enough money.

Table 7.12: Availability of money versus treatment chosen, all cases

TREATMENT TYPE	% CHOOSING TREATMENT IF:	
	MONEY AVAILABLE	MONEY WAS NOT AVAILABLE
PHU treatment	275 (24.8%)	235 (16.4%)
Other medical treatment	285 (20.3%)	162 (11.3%)
Self-treatment with drugs	490 (44.3%)	324 (22.6%)
Self-treatment with herbs	63 (5.7%)	449 (31.4%)
Traditional healer	54 (4.9%)	63 (4.4%)
No treatment used	-	199 (13.9%)
Total	1107 (100.0)	1432 (100.0%)

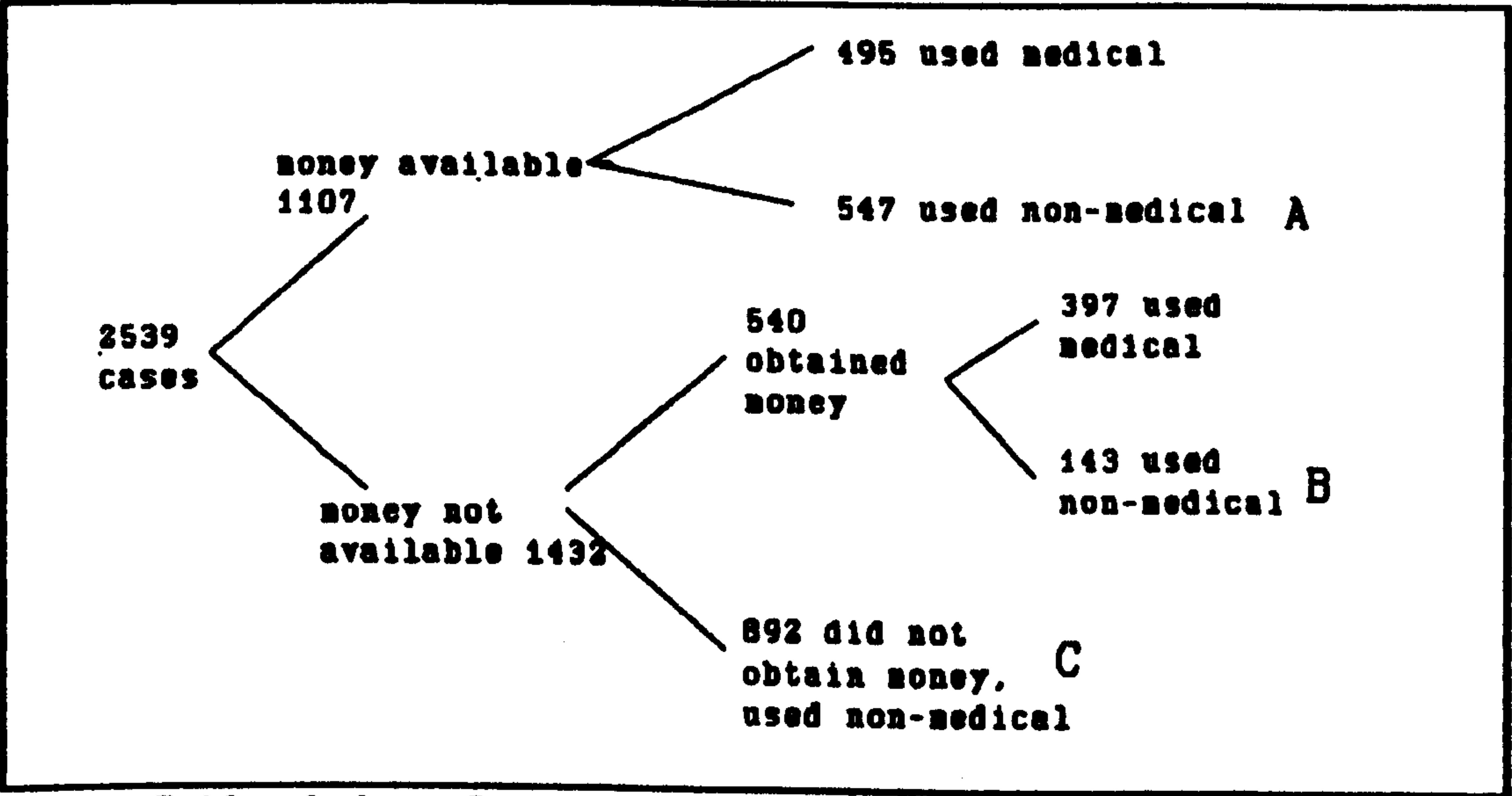


Figure 7.10: Choice of treatment related to availability of money in the household

Looking at the difference in the effect of availability on the different forms of medical treatment, the relative decrease when money was not available for 'other medical' (20.3% to 11.3%, a drop of 59%) was greater than for PHU treatment (24.8% to 16.4%, a drop of 34%). This suggests that PHU treatment was substituted for more expensive treatments in some cases where the expected price was not available in the household.

7.6.3 Availability versus income

Availability of enough money at home to pay the full cost of treatment was also related to income. As seen in Table 7.13 and Figure 7.11, there was a consistent pattern of increasing availability at any given price level with increasing income. For the prices paid for PHU treatment (most of which were between 50 and 200 leones) availability increased regularly with household income but the differences were not statistically significant. The differences between per capita income groups were statistically significant due to high availability in quintile III.

Table 7.13: Availability of money at home for PHU treatment by income group

% cases in which money was available:	Income Group					
	I	II	III	IV	V	All
Household Income Group (p=.676)	48.3%	51.6%	53.8%	55.8%	58.3%	53.9%
Per Capita Income Group (p=.032)	47.0%	50.5%	65.3%	49.4%	61.2%	53.9%

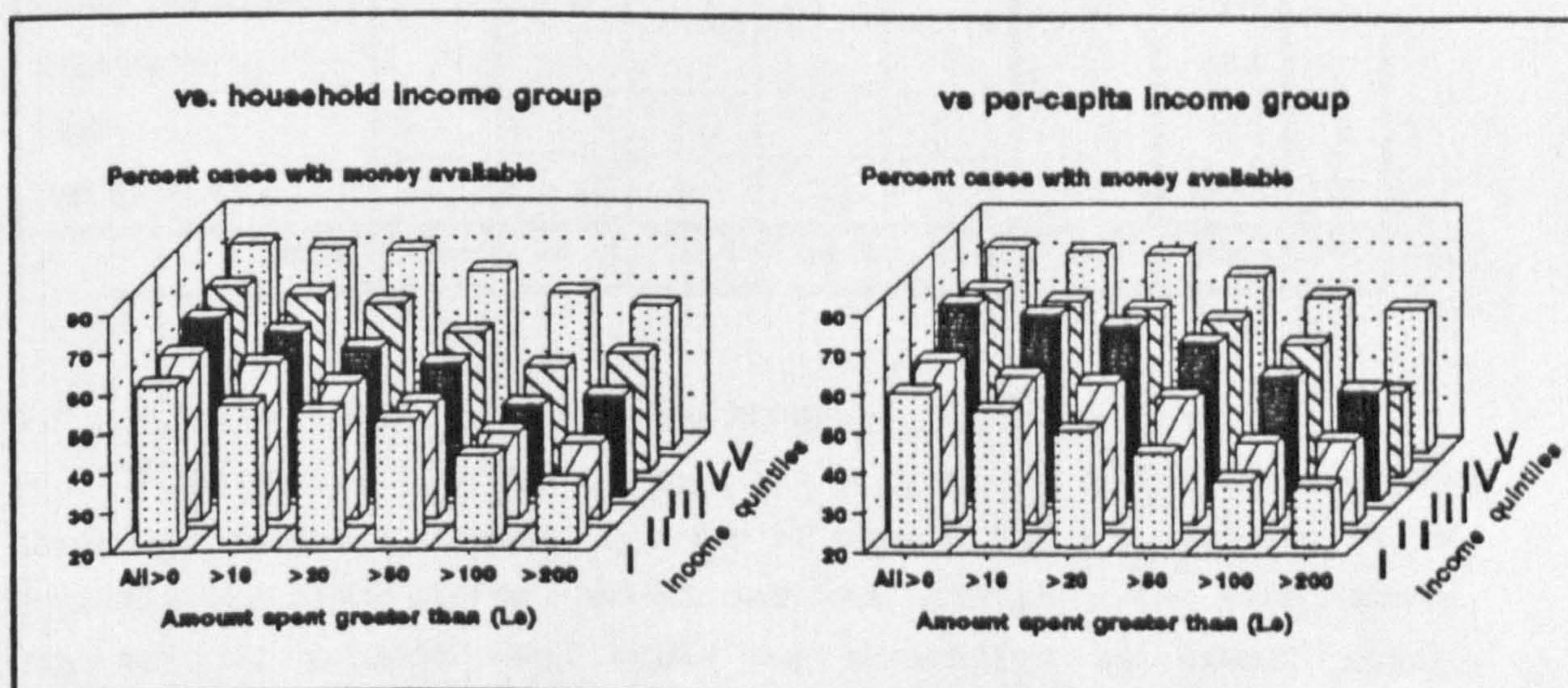


Figure 7.11: Availability of money at home by income group

7.6.4 Availability versus age and sex

There were no statistically significant differences in availability of money in the household related to the age or sex of the patient, as might have been the case if household resources were not shared equally and

wives (who might have fewer resources) were solely responsible for the care of themselves and their own children. From the rainy season survey data (when more demographic information was collected), wives in polygynous and extended households appeared to have the same degree of access to money for treatment as wives in smaller households and as men.

7.7 How money was obtained and the risk entailed

Respondents who paid some amount but did not have the money at home were asked how the money was obtained. The coded responses included the possibility of having had only part of the money at home, or receiving treatment on trust (credit). As seen in Table 7.14, borrowing from a friend or relative was most frequently mentioned, followed by selling rice or other food supply, and then by receiving a gift. When property or produce was sold or pledged, the amounts involved tended to be lower than when money was raised by borrowing or receiving gifts.

Table 7.14: First method mentioned of obtaining money (first action taken)

	Percent Using Method in Geographic Area					Z Used All Areas	Mean Amount Raised	Nr. Cases
	BNK	BUY	LAN	NAL	URB			
SOLD RICE/FOOD CROP	10.1	21.5	32.0	15.8		20.9	175.1	114
SOLD/PLEDGE CASH CROP	4.6	5.8	5.0	2.5		4.4	158.4	24
SOLD POSSESSIONS	3.7		3.3	.8		2.0	74.6	11
PLEGGED OTHER PROPERTY		1.7	4.4	.8		2.0	102.7	11
BORROW MONEYLENDER		3.3	.6	3.3		1.7	809.3	9
DEB GIFT/SUBSCRIPTION	8.3	9.1	5.5	12.5	42.9	9.4	266.6	51
BORROW FRIEND/RELATIVE	54.1	46.3	35.9	49.2	21.4	44.4	284.5	242
PRODUCED FOR SALE	1.8		3.3	.8		1.7	74.0	9
SOLD ANIMAL	.9	.8	.6	.8		.7	185.2	4
DEDUCTED FROM SALARY			1.1			.4	30.0	2
DEFERRED ON TRUST	2.8	2.5	4.4	5.0	7.1	3.9	214.5	21
HAD PART OF MONEY	11.0	6.6	2.8	2.5	7.1	5.3	386.5*	29
USED BUSINESS CAPITAL		.8		2.5	21.4	1.3	179.0	7
PAID IN KIND	.9	.8		.8		.6	267.3	3
PLEGGED PLANTATION		.8				.2	200.0	1
EXTRA LABOUR	.9					.2	10.0	1
OTHER			1.1			.4	10.5	2
DONT REMEMBER	.9			2.5		.7	493.3	4
Totals	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	leones	545

*TOTAL PAID

7.7.1 Adverse Effects of Obtaining Money

The range of possible effects on the household of different ways of obtaining money was assessed by means of some of the case studies (#4, #6, Appendix 2), focus groups, and discussions with interview team members. The various methods used could be classified as either rarely, conditionally, or never involving a risk of long or medium-term financial hardship. Receiving a gift ('subscription') was obviously a low-risk method (9.4%). Having payment deferred by the provider (3.9%), or having money deducted from salary (0.4%) generally involved lenient terms. Those who stated that they had part of the money on hand (5.3%) made up the rest (in all but one case) in one of the previously mentioned low-risk ways.

Selling an animal (0.7%) was considered low-risk because the animals were usually chickens, more rarely goats, and never work or milk animals. Selling or pledging a cash crop (4.4%) is also a normal, risk-free way of raising small amounts of money, and doing extra labour (0.2%) or producing something for sale (1.7%) were likely to affect normal activities only for a short time. These methods accounted for 26.0% of cases where the money was not immediately on hand. Methods judged to usually have the potential of placing some additional hardship on the household included borrowing from a moneylender (1.7%), pledging a plantation (0.2%), pledging other property (2.0%), using business (petty trading) capital (1.3%), and selling possessions (2.0%), totaling 7.2%. In no cases were farm tools or land reported sold.¹

Methods which could have adverse effects under some circumstances were selling rice (20.9%) and borrowing from a friend or relative (44.4%). Since the household interviews did not ask in detail about the results of obtaining money in these ways, some assumptions were used in the analysis. For selling rice², the mean amount was less than that raised through gifts or borrowing, but still represented about 15 cups of rice, not an insignificant quantity (adults consume about one cup per day). A lack of rice was considered by most people to represent no hardship if it persisted for no more than a day or two, but could have more serious effects if it persisted longer even though substitutes such as cassava might be available. The more self-sufficient rice-farming households (ones reporting that they had to buy rice only for short periods throughout the year), or households which had high income from cash crops or non-farming sources probably would have had enough on hand to eat even if they did not have cash and had to sell some rice. Applying these criteria (>1 day of household rice consumption sold, lower 3 quintiles of per capita income,

¹These judgements about the risk of adverse effects do not take into account the problem of delayed effects from current unplanned expenditures, such as not being able to pay school fees for the next term. Some overall household expenditure data is presented in Chapter 10, but without knowing marginal consumption rates for all budget items it is difficult to know which items would be most reduced. The responses in the focus groups to this line of questioning were not very useful.

²Richards (1986) described how a household's store of rice is a preferred form of savings which not only retains value during inflation, but because its price fluctuates with the season, is often traded by both producers and middlemen for profit.

and having to buy rice for more than 2 months if rice was a subsistence crop) placed 13% of cases in which rice was sold into the 'risk' category.

Borrowing from a friend or relative most often took the form of a small amount of rice which was then sold for cash. Repayment was almost always on flexible terms and small loans were sometimes written off. Interest was required in some cases when large amounts were borrowed, but this was not asked in the household interviews, so similar criteria to those used to determine if selling rice was 'risky' were applied to loans: if the loan exceeded 5 days rice consumption and the farmer was not self-sufficient (buying rice more than 2 months per year), the loan was considered potentially risky (without regard to income). This resulted in 15.7% of all loans being classed as involving risk, mostly the ones for higher amounts, with a significant number in the upper range of PHU payments (80-180 leones).

Using these criteria, only 3.7% of all illness cases (including those who paid nothing and those where money ~~was~~ available at home) obtained money in ways presumed to entail some risk. Limiting the cases to those for which an amount greater than zero was paid raises this figure to 5.7%. In terms of geographical differences, LAN had the highest risk level as a result of the prevalence of high-risk methods, but MAL (the wealthiest rural area) was the next highest. This was probably due to lower self-sufficiency in rice in both LAN and MAL (coffee and cacao growing areas). The high prices paid for most treatments in MAL elevated a higher percentage of those who had to sell rice to raise money into the risk category. In LAN, the poorest area, a relatively high percentage sold rice or used other high risk methods, probably because there were fewer other households that were able to give or loan money.

Severity affected the ways in which money was obtained. There was a higher rate of seeking gifts for severe cases using medical treatments, but for all treatments combined, selling rice was the method most closely associated with severe illness. This explains most of the difference in risk levels also: although the differences were not statistically significant because of the small number of cases, 68.9% of cases using 'high risk' methods of obtaining money were severe, versus 59.0% of cases

using 'low risk' methods. It is possible that advance knowledge of the price of treatment affected the way money was obtained, but severe and non-severe cases not using medical treatment had nearly identical expectations of what the price of medical treatment would have cost.

7.7.2 Effect of income on the risk of adverse effects

The distribution of risk cases by the amount paid and by income group (Tables 7.15 and 7.16) shows that the risk of adverse effects increased with the amount paid and decreased with income. Examination of the ways that different income households raised the money sheds some light on this (Table 7.17). If they did not have the money on hand for treatment, the wealthiest households frequently were able to, and probably could afford to, sell rice or other food. They needed or wished to borrow money or receive gifts less often, and they had more recourse to other low-risk methods. The degree that richer households sold rice more often than the poorer ones may also be the degree to which they were free to lend rice to poorer households. This is suggested by the first two lines of Table 7.17. Quintile III appears to be caught in between - it could not sell as much rice as the two wealthier groups, but nor did it borrow or receive gifts any more than they did, so it resorted to more high risk methods, especially selling or pledging possessions.

Table 7.15: Risk obtaining money versus amount paid¹

Amount Paid (Le) (N)	1-20 (448)	21-40 (262)	41-80 (263)	81-180 (273)	>180 (301)	ALL AMOUNTS
% of cases obtained with risk	3.1%	0.8%	5.7%	6.2%	20.9%	7.0%

¹For PHU use, 6.7% of cases were 'high risk', and for 'other medical', 12.4% were.

Table 7.16: Risk obtaining money versus income group

Income Group	I	II	III	IV	V	ALL GROUPS
% of cases obtained with risk (household income)	4.5%	5.1%	6.4%	4.8%	1.7%	7.0%
% of cases obtained with risk (per capita income)	4.8%	5.4%	6.2%	3.3%	2.9%	7.0%

Table 7.17: Methods of obtaining money used by household income groups

Method Used	% Method Used by Income Quintile				
	I	II	III	IV	V
SELL RICE	13.4%	19.7%	17.8%	25.0%	31.9%
BORROW FROM FRIEND/RELATIVE	51.3%	47.0%	41.1%	46.2%	34.0%
GET GIFT	11.8%	15.4%	5.6%	5.8%	6.4%
OTHER LOW RISK	14.2%	9.4%	13.9%	15.3%	21.3%
HIGH RISK	7.3%	8.8%	11.2%	8.9%	3.4%
ALL	100.0%	100.0%	100.0%	100.0%	100.0%

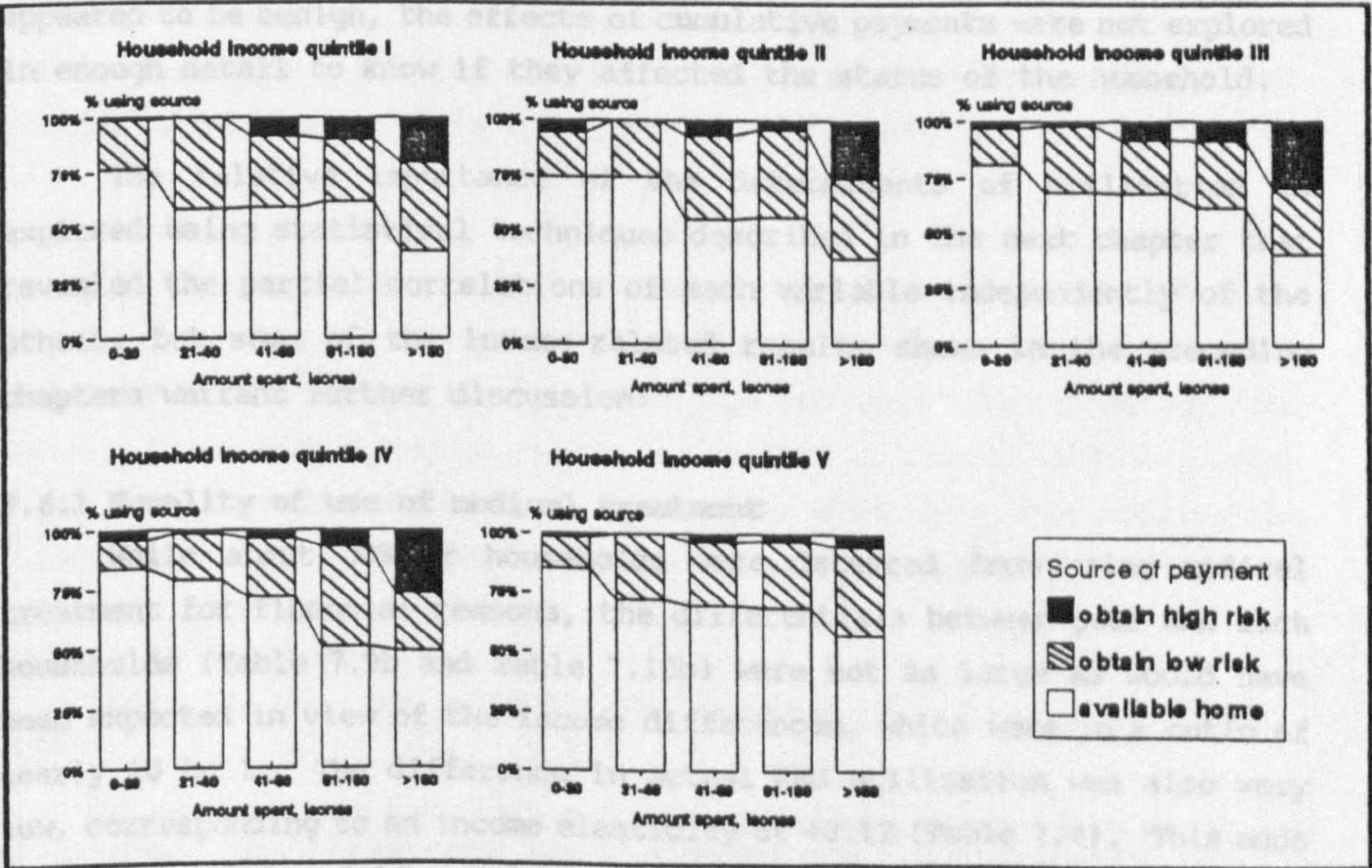


Figure 7.12: Source of payment vs. amount paid, for income groups

The combined effects of price and income are shown in Figure 7.12, where the dark segments of the vertical bars represent cases for which the method used to raise the amount paid could have had adverse economic results. Similar patterns are seen in the 4 lower household income groups, with significant risk associated with the highest level of payments and rather less in the range of PHU costs. For all income groups taken together, PHU treatment involved risk in 6.7% of cases, versus 12.4% of 'other medical' treatments.

7.8 Discussion of Preceding Analyses

Income had an apparent effect on the use of the more expensive forms of medical treatment, but if 'vertical' equity is defined in terms of equal utilization or access to treatment by different income groups, then equity of PHU use appeared to be high. Access and preference factors appeared to determine the utilization of medical treatment much more than did the socio-economic status of the household. The poorest households consequently paid a much higher percentage of their income for treatment, so if vertical equity could be said to be low if it were to be defined by this criterion. While the effects of payment for individual treatments appeared to be benign, the effects of cumulative payments were not explored in enough detail to know if they affected the status of the household.

The relative importance of the determinants of utilization is explored using statistical techniques described in the next chapter that revealed the partial correlations of each variable independently of the others, but some of the income-related results shown in the preceding chapters warrant further discussion:

7.8.1 Equality of use of medical treatment

While about 30% of households were deterred from using medical treatment for financial reasons, the differentials between poor and rich households (Table 7.9b and Table 7.10b) were not as large as would have been expected in view of the income differences, which were in a ratio of nearly 10 to 1. The difference in actual PHU utilization was also very low, corresponding to an income elasticity of +0.12 (Table 7.4). This adds up to a scenario of high priority being placed on allocating household

income to treating illness, but somewhat inconsistent with this is the high rate of financial deterrence observed in the highest household income groups. Only the highest household income quintile was significantly different from the rest in these aspects of treatment choice behaviour.

7.8.2 Equality of poverty

While the overall equality of income distribution in rural Sierra Leone may be better than many developing countries, it is still the case that 63% of the population falls below the average income level, meaning they have incomes of less than \$US 87 per capita (based on the average for rural areas from the NHIES), not all of which is initially in cash. Most wealth indicators such as possessions were quite modest in scale and variation: a well-off household might own 1 or 2 wristwatches, or perhaps a sewing machine or radio/cassette; electrical appliances, motor vehicles, and even bicycles were virtually non-existent in the rural areas. Even though the upper 20% of households were many times better off than the lower, the highest per capita income quintile enjoyed a mean income of only \$US 572 per capita per year, with the highest household income group having a total household income of \$US 3670¹. This income level supports few luxuries, and apart from lending money to other households (mean amount loaned by the highest income households was \$US 114 per year), ceremonies and feasting (\$US 643 per year or 21% of income) were the most apparent form of 'conspicuous consumption' by well-off households².

7.8.3 Availability of money

The immediate availability of money appeared to affect utilization, but the data (Tables 7.12a and 7.12b) do not suggest an unambiguous relationship. It is difficult, and perhaps not valid, to reconstruct the decision process from the observed outcomes, but it appears that not having enough money immediately on hand resulted in about 1/3 lower utilization of medical treatment. The small differentials between rich and poor in the

¹Based on this survey data, corrected by using the exchange rate of 29.5 to correspond with the NHIES.

²The richest households also had a 'possessions' score of about 4 times that of the poorest, but as mentioned, this rarely amounted to more than a few wristwatches and a radio/cassette. More wealth is probably stored in the form of good clothing, but this was not counted in the possessions index.

use of medical treatment arise in part from the relatively equal availability of cash at home in the amounts needed. 54% of cases using PHU treatment had the money available at home, with no significant difference between household income groups. The exact meaning of this percentage is important to the understanding of the deterrence data but difficult to ascertain from a cross-sectional survey: it could mean that the 46% of cases that did not have the money available came from households where that amount of money is never available, but it is more likely that availability is more a random event, and the percentage represents the probability that a household will have the money available at any given time.

The high rate of financial deterrence claimed by high income households was surprising, but is partly explained by the relationship between household and per capita income. 43.6% of household income group IV and 14.6% of household income group V households fell into the three lowest per capita income quintiles (median per capita incomes \$US 43, \$US 96 and \$US 150), so it is plausible that the equivalent of one or two dollars would not be available, especially if the household head was away from home. Quite apart from the major seasonal variations, income may be irregular: a large farmer may have just paid hired labour, the coffee broker may be late in visiting the area, the civil servant's salary is delayed. In terms of assets, most households except perhaps the very wealthiest 20% or so are evidently in the same situation. The only real credit-worthy assets in rural areas are rice farms and cash crop plantations, which are limited in productivity by a scarcity of labour and are subject to the risk of a poor harvest.

7.8.4 Apparent price effects

While price elasticity per se for treatments could not be estimated from the household survey data, there was an apparent association between the local price-to-income ratio for PHU treatment and the elasticity of demand for PHU treatment with respect to income. However, even in the geographic area in which the highest income elasticity was observed the income effects were rather small, but the relationship does suggest that when the price of a single visit exceeds a certain percentage of income, the poor begin to be deterred more than the wealthier households.

7.8.5 Incorrect expectations of cost

Some deterrence from using PHU treatment was certainly promoted by incorrect expectation of the cost. All income groups had nearly the same idea of how much medical treatment would have cost, but this was much nearer to the cost of hospital visits or private practitioners than to the cost of PHU visits. Thus while the true price might well have been available or would not have deterred someone from obtaining it in some way, the amount thought to have been needed (several times the actual cost) acted as a deterrent. Since the PHUs, government hospitals, and most mission hospitals charge outpatients on the basis of the drugs dispensed, and the charges in PHUs had been established a relatively short time before the survey, this lack of clear information is not surprising.

7.8.6 Effect of severity of illness

For severe illnesses, the income differential seen for the more expensive forms of medical treatment nearly vanished. The small relative increase of the solid lines in Figure 7.13 indicate that demand for both PHU and 'other medical' treatments was nearly inelastic with respect to income for severe illness. When illness is severe, the consequences of not getting better may be more dire for poor households, which have fewer adult hands available to substitute for sick household members.

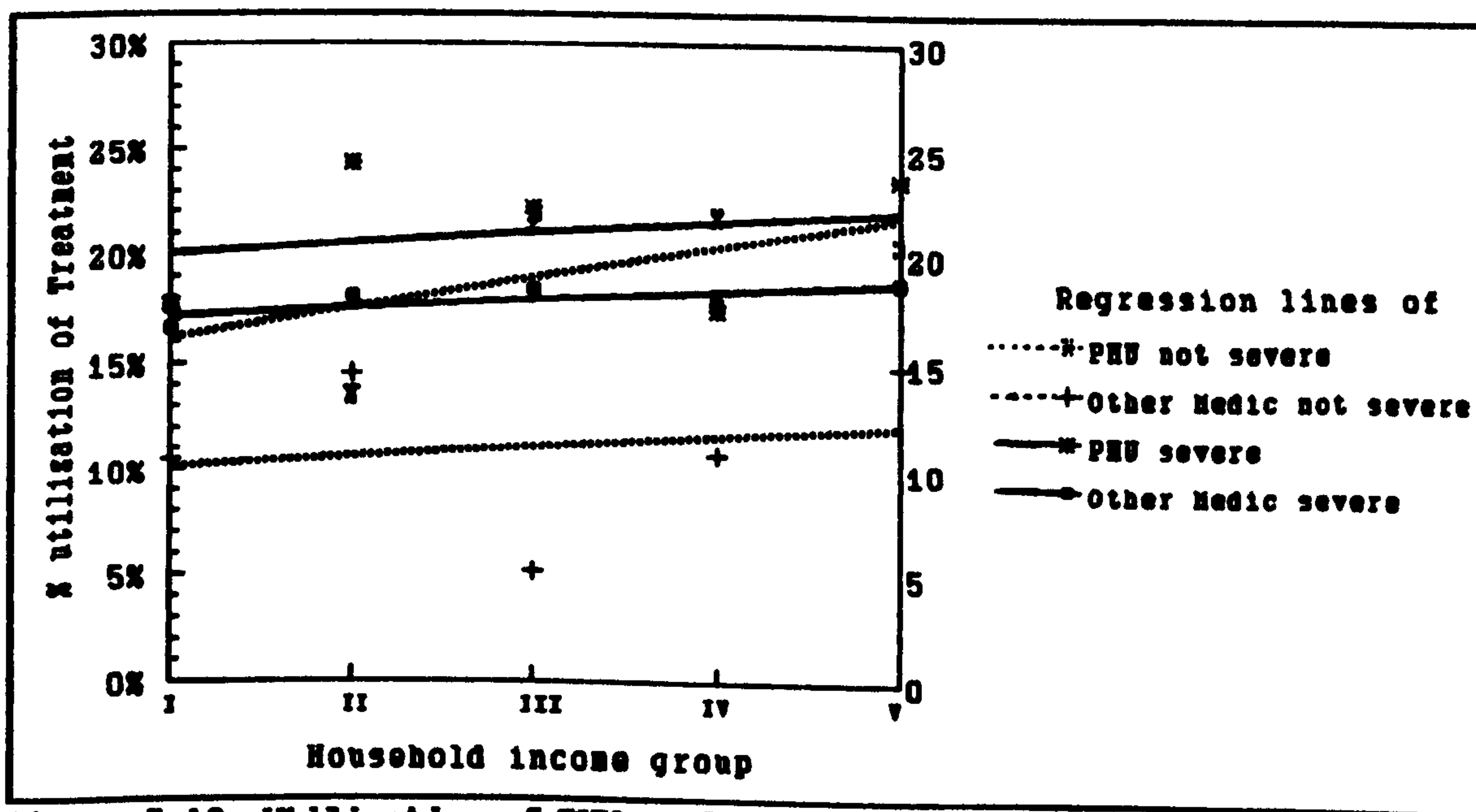


Figure 7.13: Utilization of PHUs and other medical by income group for non-severe and severe illness episodes

The price of an individual PHU visit represented about 0.5% of total household income for the poorest group, and a single 'other medical' visit cost about 1.7% (Table 7.6). These levels may not represent a severe deterrent, especially for severe illness, but the relative equality in the use of medical treatment meant that poorer households paid upwards of 10% of total household income on treatment over the course of a year. There were large differences between geographic areas as well, with the poor appearing to suffer the greatest burden of expenses in the wealthier rural areas. Most of the total expenditure was for hospitals and private practitioners rather than PHUs, but even PHU visits alone aggregated over the year cost 5% of the poorest households' income. It is not difficult to comprehend the degree of hardship this could represent for the poor, but the deterrence of households in the upper income groups, for whom a single visit represented only 0.05% to 0.10% of income, remains a paradox which can be best explained by the hypothesis that cash availability is highly random over time.

When the money was not available, the amounts associated with PHU treatment could nearly always be obtained in ways that involved little risk of longer-term adverse effects. The willingness to spend the amounts of cash on hand (undoubtedly small in the case of low income households) or go to some effort to obtain the money, may be due in part to a perception of high quality of PHU treatment based on collective results and the availability of drugs.

Perhaps the most important factor promoting equality of utilization of PHUs is the possibility of borrowing. This was by far the most common way of raising money for treatment when it was not on hand, and is therefore an important strategy for coping with illness. A more formal type of mutual aid society was said to exist in only 9 of the 36 villages surveyed.¹

There appears to be a small surplus of cash in the village which can make its way around to those in need. 19% of household heads interviewed said they owed money to someone (median amount = Le 1000) and 15% owed rice

¹Most of these were collective farms the produce of which was used for community purposes; only one was an *osusu* or 'tontine' that existed for making loans to members.

(median amount = Le 2100). Similar numbers said they were owed money and rice, in amounts approximately the same as owed by others. In all, 26.4% of household heads were in debt, and 23.4% had made loans of cash or rice. All income groups were likely to be both lenders and debtors, but the wealthiest quintiles owed, and were owed, by far the most and the poorest owed the least¹. When asked how one manages to support a family in these disastrous economic times, a common good-humoured answer in Krio is "dig hole an' cober", meaning one borrows (dig a hole) and then borrows again from someone else to pay back the first loan (cover it up).

The high equality of availability of money for PHU and drug treatment might also have been also due to the potential for easy borrowing. Most low income households probably did not actually have much money in pocket in readiness for an emergency, but they might have been freer to spend the day's housekeeping money knowing that they could easily borrow some rice or money from a relative or friend. When household heads were asked how they would obtain Le 500 for an emergency, even the wealthiest said more often that would borrow than that they would have this amount on hand (Table 7.18).

Table 7.18: Methods used (hypothetically) to obtain Le 500, by household income group^a

Income Group	I	II	III	IV	V	ALL GROUPS
Would have Le 500 on hand	10.2%	14.2%	19.8%	26.3%	31.1%	20.1%
Would borrow	60.6%	59.4%	50.5%	48.4%	43.2%	52.5%

^aSimilar results were found by per capita income group

According to focus group discussions (Appendix 4), the system works because borrowing is treated seriously: loans are nearly always eventually paid back because there is no recourse in emergencies once a good reputation is lost; in that case a family may have to leave the area and

¹Richards (1986) noted that rice loans to ward off pre-harvest hunger are not seen as unduly exploitive by those who take them: the creditor-debtor role may easily be reversed someday due to a change in fortune, and farmers are generally optimistic that by a change of planting strategy they can achieve better results next season and will be able to repay the loan.

start anew. The fear of not being able to repay a loan, even under the most lenient of conditions, may account for some of the greater financial deterrence of poorer households. They may also be unable or unwilling to sell rice, the next most common way of raising money.

7.8.7 Different behaviour for use of drugs

While demand for PHU treatment, for the more expensive 'other medical' treatment options, and for self-treatment with drugs were all nearly inelastic with ^{respect to} household income, the consumption of drugs for self-treatment appeared to be more associated with higher per capita income. This apparent anomaly might be explained if a different process of allocating resources in the household were used in the case of drugs.

While wives are financially responsible for certain aspects of their own lives and their children's, it is the household head who generally pays for medical treatment. In the rainy season survey round it was asked who had provided the money where payment was involved. In 67% of cases it was the household head, with a wife, the patient, or another person paying in only 33% of cases. Since male household heads were the patients in fewer than 25% of all cases, it can be taken that they usually pay for other household members. However, there was a significant ($p < .001$) difference in this pattern for different treatments. The household head paid for 79% of cases using PHUs, but for only 53% of cases in which drugs were used. This could mean that drugs were used when the household head did not have the higher amount of money available for medical treatment or was temporarily absent, or that the decision to use drugs is made more independently of the household head than are decisions about medical treatment. This could also explain the stronger relationship between use of drugs and per capita income, since the number of earners in a household increased more rapidly with per capita income than with household income (Table 7.19), with the most frequent second earner being a wife who is a petty trader.

Table 7.19: Number of earners (including remitters) besides household head vs. income

Income group	Number of other earners per household	
	by Total Household Income group	by Per Capita income group
I	.11	.09
II	.12	.11
III	.17	.14
IV	.18	.19
V	.26	.31

Based on observed patterns of obtaining money, it appears that self-treatment with drugs is often used when money is unavailable at home but it is considered important to use some treatment. For medical treatments and traditional healers there was no significant difference between severe and non-severe cases in whether money was available at home, but for drugs 34% obtained money outside the home in non-severe cases, versus only 22% for severe cases.

Summary

To summarize the results described so far, medical treatment, including treatment at government primary health units (PHUs) cost significantly more than any form of self-treatment or traditional treatment. Analysis of the household survey data using cross-tabulations indicated that the important factors which seem to direct people to use medical treatment when they fall ill include the severity of the episode, the particular type of illness, the age of the patient, the 'modern' orientation of the household (as measured by school attendance of children) among 'preference' factors; and distance from health facilities ('access' factors). While higher (total) income households used the more expensive forms of medical treatment (hospitals and private practitioners) more often, the decision to use the PHU showed relatively little relationship to either household or per capita income. The use of drugs appeared to be related closely to per capita income.

When medical treatment was not used, in over half of all cases lack of enough money was given as the main reason. This rate decreased with increasing income, but the percentage of cases deterred from medical treatment for 'financial' reasons still exceeded 25% for the highest income group, perhaps

reflecting the relative equality of circumstances in most rural areas.

Correct information about the cost of PHU treatment appeared to be lacking, with most people associating it with the higher cost of hospitals and private practitioners. In only 25% of cases in which non-medical treatment was used because of lack of money was the respondent's expectation of the cost in the range of PHU treatments.

The proportion of cases deterred from using medical treatment for reasons of cost was much greater than those using medical treatment but risking adverse effects on the household. There was apparently greater willingness to do without medical treatment (30% of all cases were deterred for financial reasons) than to raise the money in potentially difficult ways (only 7% of cases). The availability of the price of treatment at home depended on the amount paid and on income, and not having the money immediately at hand appeared to affect the choice of treatment: all income groups were able to obtain money, but only the wealthiest quintile was able to do it with significantly lower risk than the lower ones. This risk was more important for the more expensive forms of medical treatment than for PHU use.

In addition to differences seen between income groups in their choice of treatment and amounts paid, significant differences were found between geographical areas in terms of morbidity rates, income, utilization of medical facilities, amounts paid, deterrence for financial reasons, deterrence of severe cases, and the degree of risk entailed in paying for treatment. Estimation of the relative importance of these factors was done with the aid of multiple regression techniques, as described in the next chapter.

Chapter 8:

Exploring the Influences on Demand for Medical Treatment:

Part C: Regression Models of Ability To Pay and Choice of Treatment

8.0 Introduction

After screening the household and personal variables from the household survey for possible relationships to treatment choice using crosstabulations, regression techniques were used to determine the unique effects (i.e., the partial correlations) of each factor. This was done in 2 stages: the first identified the household-level factors most closely related to ability to pay; in the second stage these ATP factors were used together with access and preference factors in models of treatment choice.

8.1 Ability to Pay Models: Household ATP indices

The aim of constructing ATP indices was to quantify the main factors that affect ability to pay for treatment, assumed in the conceptual model to be income, wealth, and other unmeasured factors. This was done using a multiple regression model with selected independent variables, of a typical linear form:

$$\text{predicted ATP} = B_0 + B_1 (\text{income}) + B_2 (\text{wealth}) + \dots + B_i (\text{variable}_i)$$

As already shown in Tables 6.5a and 6.5b, the level of payment was closely associated with the type of treatment used. The conceptual model assumes that if preference for non-medical treatment and poor access to medical facilities were not constraints, the choice of treatment should be directed toward medical treatment, unless limited by ability to pay. Even within the bounds of choosing medical treatment, a range of prices could be paid, depending on such choices as hospital outpatient versus PHU treatment, paying transport costs or walk, or requesting an injection when not strictly necessary, or on the provider's assessment of how much the patient should be charged. If a household-level variable is defined which is related to amounts paid and controlled for extrinsic factors, the

intrinsic wealth and income factors affecting ATP could be identified by comparing households that pay different amounts.

8.1.1 Conceptual problems associated with ATP variables

As far as possible, the ATP index should reflect differences in ATP only, and not access or preference factors. Households which might have had high ATP but paid only a small amount because they preferred to use self-treatment or none were thus eliminated from the dataset, based on the reason given for using non-medical treatment. The 4.6% of cases using traditional healers were also eliminated because of the unusual types of illness and payment often associated with these cases. By this stage 1697 illness cases out of the original 2543 remained in the sample.

Multiple cases: Two further conceptual problems arose in the development of the ATP index. First, in addition to the fact that 11% of illness cases involved a second action, most households reported more than one illness episode in the recall period. The distribution of the number of illness episodes is shown in Figure 8.1.

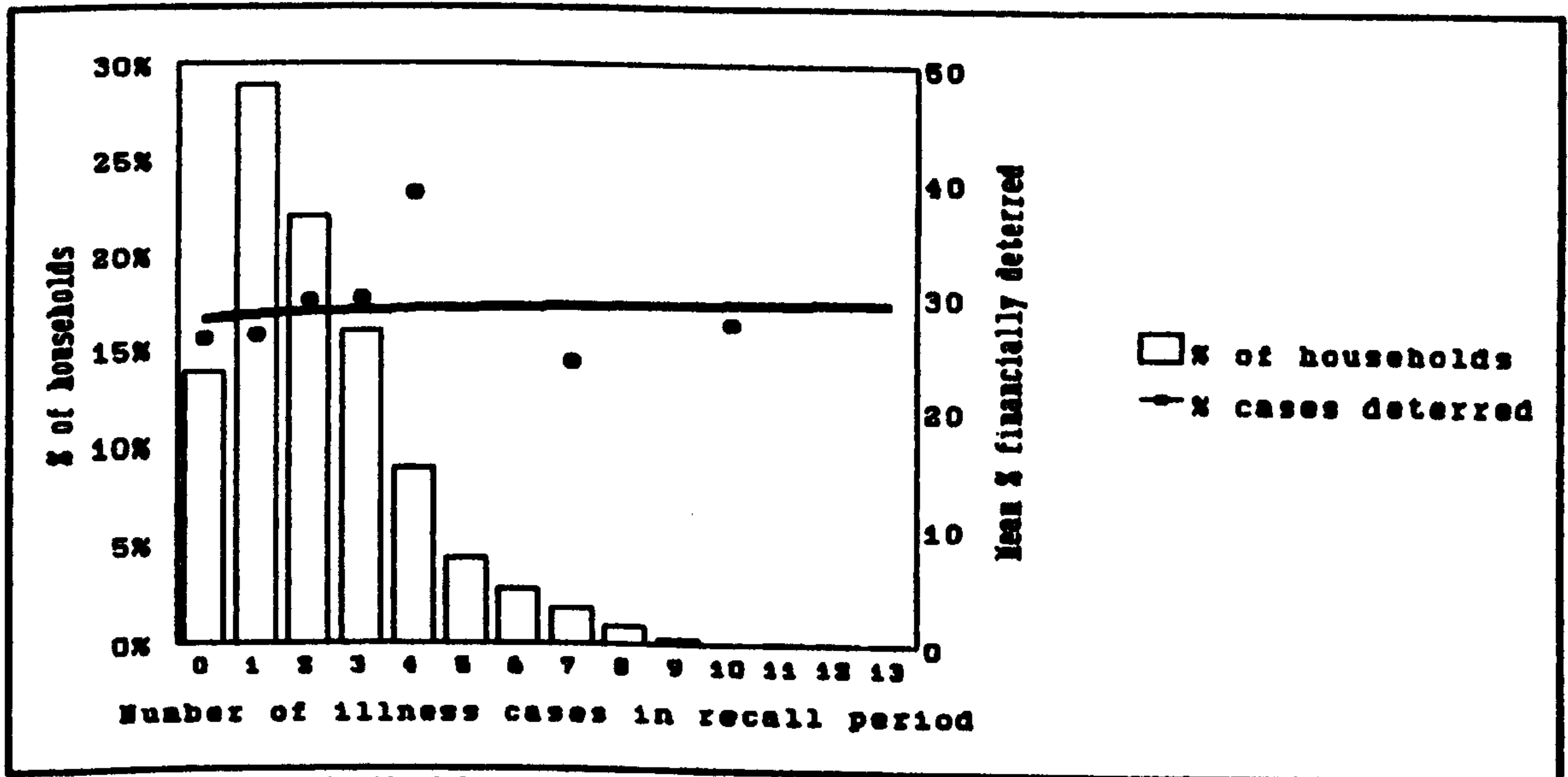


Figure 8.1: Distribution of number of illness cases per household and the percentage deterred for financial reasons

It was generally true of a household having multiple cases that some cases received medical treatment but others did not, for financial or other reasons. For example, of the 185 households which had 3 cases, in 96 (52%) no cases were financially deterred; in 35 (19%) 1 of the 3 cases was

financially deterred; in 34 (18%) 2 of the 3 cases were financially deterred and in 20 households (11%), all 3 cases were financially deterred. It appeared that some households with multiple illnesses reach^d a limit in their ability to pay during the period, or rationed their funds and credit, with this limit probably being related to the household's ATP. (This effect is illustrated in Appendix Figure A1.2, which shows that households in LAN chiefdom exhausted their available money after 4 to 6 illness episodes in the recall period, whereas this was not observed in other areas.) The simplest way of taking this fact into account would be to use as the ATP index the total of all amounts spent on treatment of ill household members in the recall period, but this would give an unwarranted low score to a household that happened to be healthy during the recall period. On the other hand, using the average amount spent on treatments per episode would compensate for varying amounts of illness between households, but would not credit households that managed to pay higher amounts for several cases with a higher score. No way was found to reconcile these two approaches, so both 'total' and 'average' indices were calculated and statistically evaluated to determine which was more closely associated with a given set of independent variables.

Different prices paid for different illnesses: Next, in addition to a household's ATP, it was possible that observed differences in the amounts paid were due to differences in types of illness, age group, distance from facilities, or geographic area. For example, if on average significantly more was spent to treat illness A than illness B, households with illness A would be credited with a higher ATP index than those with illness B even though the same type of treatment had been chosen. There was no reason to suspect that eliminating any particular illnesses would bias the remaining sample, so this problem was resolved by eliminating all cases with illnesses for which the mean amount paid was significantly different from the overall mean. Expensive (but relatively rare) conditions such as hernia and complications of pregnancy were dropped, along with such inexpensive ones as toothache and 'chest pain'. All other factors (age, distance from PHU, geographic area) either had no statistically significant effect on the mean amount paid, or the differences could be explained by overall differences in PHU and 'other medical' utilization, and would therefore not be an artefact. An exception was for respiratory diseases,

which showed significant differences after controlling for treatment choice in the amount paid in different geographic areas. These were dropped from the dataset, leaving 1427 illness cases which either used medical treatment or were deterred from it for financial reasons, did not use traditional practitioners, and were controlled for the amount paid with respect to illness type, distance from a PHU, patient's age, and geographic area.

The resulting dataset contained expenditure data (the ATP indices) and wealth and income variables for 647 households out of the 1026 which had reported any illnesses. Table 8.1 gives mean values for the two ATP indices calculated. Mean household income for this subset of cases was within 2% of the entire sample, and differences by geographic area were less than 7%, so it was reasonably representative of the overall household sample. Logarithmic transforms were calculated for the aggregated average and total amounts spent in order to more closely approximate a normal distribution, and also for independent variables that had large ranges. Descriptive statistics of the variables tried in the ATP regressions are shown in Table A1.13.

Table 8.1: ATP index values by geographic area (full sample)

	Aggregated Household Expenditure on Selected Treatments		Number of Households
	AVERAGE per episode (Le)	TOTAL all episodes (Le)	
BMK	64.0	135.8	135
BUY	131.3	281.9	126
LAN	147.1	256.3	166
MAL	236.4	401.9	165
URB	144.8	236.3	55
ALL AREAS	149.3	271.6	647

8.1.2 Weighting factors for different ways of obtaining money

The final problem concerned the possibility that, as well as the actual amount spent, the way in which money was obtained also reflected ATP. It could be argued that households having a given amount on hand at home had higher ATP than those which did not, and those obtaining a sum in a low-risk way had higher ATP than those which had to use a high-risk method. If this were so, it would be necessary to either include a

weighting factor which would take account of this (e.g., amounts spent which were available at home might be worth 1.5 times those obtained by a low risk method, 2.5 times those obtained by a high risk method.), or to control for this effect by analyzing these groups separately. The approach used to find the correct weights was to measure the correlation between the ATP indices and the independent variables using different weight factors, starting with factors of 1.0 for all three groups. The highest correlations occurred when weights from 0 to 0.1 were applied to cases in which money was not available at home, which meant in effect that the best correlations (and therefore the most valid models of ATP) could be obtained when cases having money available at home were treated separately from those in which money had to be obtained by some method.

8.1.3 Correlation of wealth and income variables with ATP indices

All of the wealth and income proxy variables from the household questionnaire dataset listed in Appendix Table A1.13 were examined for their suitability as independent variables in the ATP regression model. Some were rejected because of many missing or zero-value cases, and others because they were components of total income which had smaller correlations than the full income variables (Appendix Table A1.14). Since the interpretation of multiple regression results is difficult when there are strong linear relationships between independent variables, the aim was to reduce the set of independent variables to a single one representing each main factor group assumed to affect ATP: current income, accumulated wealth, status, credit, demographics of extended family, etc. Variables with a high degree of covariance and low correlation with the ATP indices were discarded. Given the small degree of association between treatment choice and income shown in Chapter 7, it was not unexpected that low correlations were found between all wealth and income variables and the ATP indices: no income variable exceeded .16, and no wealth variable exceeded .38.

A series of regressions showed that total household income (rather than per capita income or any income component) had the highest correlation with the ATP indices, and that the log-transformed indices were better correlated with most income and wealth factors than the non-transformed indices. The beta coefficients were quite low however, ranging from .12

to .15 against LNAVG (the logarithm of the average amount spent per episode), with R^2 of only .015 to .025.

Wealth variables were then selected on the basis of high correlation with ATP and low correlation with total income. The amounts of money reported to be held by the household head in the dry and rainy seasons (POCK_MAX and POCK_MIN), were the variables that best met these criteria. When they were entered into the model they improved the sample R^2 over that obtained with income alone, whereas when most other wealth variables were entered, they lowered this statistic and the beta coefficients changed in ways that indicated high correlation with income. Adding other wealth variables did not improve the regression. The regression model's statistics in Table 8.2 reflect the observed low correlations with the average the household spent on treatments, and indicate that wealth and income (as measured) account for only 5% to 10% of observed variation in the amount spent. According to the beta coefficients, income was more important than wealth when money was available at home, while the reverse was true when money had to be raised outside the household by low-risk or high-risk methods. Since the significance of all coefficients was between ($p=0.05$) and ($p=0.10$), these relationships are not definitive.

Table 8.2: Regression statistics for POCK_MAX and household income against ATP index LNAVG

	Money available at home	Money obtained all methods	Money obtained high risk methods	All cases combined
B _{TOT_INC}	1.17×10^{-8}	6.64×10^{-8}	1.02×10^{-8}	6.34×10^{-8}
B _{POCK_MAX}	5.09×10^{-8}	3.75×10^{-8}	5.55×10^{-8}	3.39×10^{-8}
Constant	1.81	2.89	1.87	1.94
R^2	.105	.056	.109	.051
Beta _{TOT_INC}	.231	.151	.210	.145
Beta _{POCK_MAX}	.207	.176	.236	.160

POCK_MAX was therefore a useful variable in representing wealth without being correlated with total income. Unfortunately, these qualities were not foreseen and it was acquired from only a 30% subsample in the household questionnaire, thereby limiting its usefulness in this analysis because of the many missing values. The wealth proxy variable with the

next best characteristics was the total of consumer possessions or its logarithm (LNOWED). As seen in Table 8.3, this variable produced different results than POCK_MAX, with the smaller beta coefficients for income reflecting the higher correlation of LNOWED with income. The beta coefficients suggest that possession of assets (or the factors that give a household the ability to accumulate them) is more important than income in determining ability to pay higher amounts for treatment. This is potentially a useful finding for the assessment of household and community ATP since household wealth proxies are generally more accessible than income.

Table 8.3: Regression statistics for LNOWED and household income against ATP index LNAV

	Money available at home	Money obtained all methods	Money obtained high risk methods	All cases combined
B _{TOT_INC}	2.91 x 10 ⁻⁶	3.02 x 10 ⁻⁶	2.57 x 10 ⁻⁶	2.93 x 10 ⁻⁶
B _{LNOWED}	0.8559	0.4673	0.7311	0.4786
Constant	1.62	2.96	1.77	1.97
R ²	.096	.040	.074	.041
Beta _{TOT_INC}	.058	.064	.052	.063
Beta _{LNOWED}	.286	.169	.250	.172

8.2 The treatment choice models

Having selected the income and wealth variables that best represented ATP at the household level, the variables representing access and preferences were included in overall models of treatment choice. The unit of analysis was the illness case, with all illness cases used this time. Logistic regression was employed because this statistical technique allows the independent variable to be dichotomous, (e.g., PHU or not PHU) rather than continuous as in the case of the ATP indices. The procedure estimates the probability of an event¹ occurring as a non-linear function of the

¹Techniques exist which simultaneously estimate the probabilities of all possible choices, the best known being variations of multinomial logit. There were 2 main reasons for not using any of these: because of the difficult technical requirements, e.g., that the consumer has prior knowledge of prices and that his utility function is known; and because the research objectives could be met with information about individual choices obtained with simpler regression techniques. In addition,

independent variables. For more than one independent variable the model can be written as:

$$Prob(event) = \frac{1}{1 + e^{-Z}}$$

where Z is the linear combination

$$Z = B_0 + B_1X_1 + B_2X_2 + \dots + B_pX_p$$

and the logistic coefficients B_i are analogous to the B coefficients in linear regression, in that e (the base of natural logarithms) raised to the power B_i is the factor by which the odds¹ of the independent variable occurring change when the i th independent variable increases by one unit.

Dummy variables representing the probability of choosing a given form of treatment were used as dependent variables in the logistic regressions. Descriptive statistics for all the independent variables tested in the regression models are shown in Table 8.4.

computer programmes for the more advanced methods are not widely available, which would restrict their use as operational tools in the field.

¹Odds being defined as the ratio of the probability of the event occurring to the probability of it not occurring.

Table 8.4: Descriptive statistics for all variables used in regression models

Variable	Mean	Std Dev	Minimum	Maximum	N	Label
USPHU	.20	.40	.00	1.00	2543	dummy for used PHU
USOTHMED	.15	.36	.00	1.00	2543	dummy for used 'other medical'
USALLMED	.35	.48	.00	1.00	2543	dummy for used any medical
USDRUGS	.32	.47	.00	1.00	2543	dummy for used drugs for self-treatment
USHERBS	.20	.40	.00	1.00	2543	dummy for used herbs for self-treatment
USTRAD	.05	.21	.00	1.00	2543	dummy for used traditional healer
USNONE	.08	.27	.00	1.00	2543	dummy for used no treatment
TOT_INC	47058.73	43649.25	.00	575000.0	2477	total household income
PC_INC	5575.37	6753.72	.00	145000.0	2477	per capita income
WALK_PI	1.08	1.12	.0	3.0	2365	walking time to nearest PHU, hours
DIST_HI	19.77	9.15	4.0	38.0	2365	distance to nearest hospital, miles
NEAR_PHU	.79	.41	.00	1.00	2543	type of nearest PHU (0=MCH, 1=CHP)
ILPHU	20.10	5.99	3.60	57.10	2543	propensity to use PHU for specific illness
ILOTHMED	15.26	4.38	.00	60.00	2543	propensity to use 'other medical' for illness
ILLALLMED	35.36	7.99	3.60	80.00	2543	propensity to use any medical for illness
ILDRUGS	32.05	10.96	.00	46.60	2543	propensity to use drugs for specific illness
ILHERBS	20.16	8.38	.00	50.00	2543	propensity to use herbs for illness
ILTRAD	4.62	2.82	.00	28.60	2543	propensity to use traditional healer for illness
ILNONE	7.84	4.09	.00	18.30	2543	propensity to use no treatment for illness
LNSCHL	-1.05	1.11	-2.30	1.41	2199	ln (school attendance index +1)
SEVERE	.59	.49	.00	1.00	2543	severity of illness (0=self-limiting, 1=other)
LNOWNEED	.70	.72	.00	3.69	2543	ln (possessions index +1)
AGEGPI	2.41	.80	1.00	3.00	2543	age of ill person

8.2.1 Analysis methods

All of these variables (and their logarithmic transforms in some cases) were tested against the independent variables in order to select the ones with the most significant regression coefficients. Household and per capita income were tested separately because of their high covariance. Five preference variables, two access variables, and two variables reflecting ATP were selected for each treatment model. Eight different models, each using all 9 variables, were estimated. Separate models were also estimated controlling for geographic area and income. The procedure used was to identify outlier cases in each run by means of the leverage statistic², and then repeat the runs without cases having high leverage. The output of a typical run is shown as Appendix Table A1.15. Each model answered the question: For the cases selected, how much influence do each of the independent factors have on the probability that this treatment will be used rather than another option?

²This statistic is a function of the residual analogous to the leverage statistic in least-squares regression, and can be used to detect cases that have a large impact on the predicted values. Fewer than 5% of outlier cases were rejected in any given run.

In linear regression the standardized B, or beta, coefficients indicate the relative importance of individual factors, and the R^2 statistic indicates how much of the total variation in the outcome is accounted for by the variables used in the model. An analogue of the beta coefficient in logistic regression is the R statistic, which represents the partial correlation (i.e., the relationship seen when all other factors are held constant) between the dependent variable and each independent variable. A positive value of R indicates that as the variable increases in value, so does the likelihood of the event occurring. These R coefficients are presented in Table 8.4 for the entire sample, and in subsequent tables for each geographic area and income group.

Table 8.5: R coefficients for logistic regression models for entire sample
(Dashes represent coefficients not significantly different from zero)

Dependent Variable: USE:	Preference Variables				Access Variables			ATP Variables	
	Severity	Illness	Modern (school)	Age ¹	Type of nearest PHU	Distance to hospital	Walking time to PHU	Income ²	Assets
PHU	-	.094	-	.104 (1)	.214	-	-.278	-	-
OTHER MEDICAL	.112	.105	.069	.082 (3)	-	-.198	.257	-	-
ALL MEDICAL	.071	.108	.023	.101 (1)	.124	-.076	-.056	-	.043
DRUGS ^a	-	.197	.042	.044 (2)	-.129	-	.018	-	-
DRUGS ^b	-	.196	.038	.043 (2)	-.131	-	.024	.047	-
HERBS	-	.197	-.082	.064 (2)	-	.078	-	-	-.031
TRAD HEALER	.044	.216	-	-	-	.128	.112	-	-.080
NO TREATMENT	-.149	.154	-	-	-	-	-	-	-.095

¹The age group having the highest likelihood is coded in brackets: (1) under 5 years; (2) 6-15 years; (3) over 15 years.

²Coefficients were the same for household income and per capita income in all models except the one using DRUGS as a dependent variable.

^aUsing total household income as the income variable.

^bUsing per capita income as the income variable.

Logistic regression provides no statistic analogous to the R^2 of linear regression of how well the sample data fit the model, but the predictive power of the model is approximated by the ratio of classification of predicted to observed outcomes. As seen in Table 8.5, the overall results are only mediocre (remembering that a coin toss would provide a success rate of 50%), although the best rate, 80.9% for PHU use,

is respectable. These results merely reflect the fact that most of the independent variables correlated rather weakly with utilization of any treatment option. While it is possible that variables were measured inaccurately, it is more likely that treatment-seeking behaviour has a large component of behaviour which cannot be predicted from the variables that were measured, or indeed perhaps any 'objectively' measured household and individual factors.

Table 8.6: Classification power of the logistic regression models

Dependent variable in model	Observed probability of outcome	Negative results predicted correctly	Positive results predicted correctly	Percentage correct overall
Used PHU	0.20	82.2%	75.9%	80.9%
Used 'other medical'	0.15	73.6%	55.0%	71.1%
Used all medical	0.35	61.2%	62.7%	66.3%
Used drugs self-treatment	0.32	60.8%	70.0%	62.1%
Used herbs self-treatment	0.20	61.6%	63.4%	61.9%

8.3 Discussion of the regression models

In Table 8.5, the column containing the coefficients for the type of illness was shaded to draw attention to the fact that this variable was always significant because of the way the dummies were defined. The influence of this factor on the outcome is nevertheless real, and since other coefficients were virtually unchanged when the regressions were run without these variables, they can be considered to contribute to the choice, although the relative degree to which they do in any given model is probably biased. Comparing the models in Table 8.5, the coefficients do suggest that there is more specificity associated with the kind of illnesses most often treated with drugs, herbs, and traditional healers, than for those for which medical treatment is more often used.

Most of the other coefficients are consistent with the results already seen in crosstabulations, although some relationships found to be statistically significant in the tables were not significant in the

regressions. This is because the partial correlations tend to reduce the significance of apparent associations when there is covariance of factors.

8.3.1 Use of PHUs

Access was the most influential factor determining PHU use, with walking time to the PHU having the largest (negative) coefficient. The type of PHU was nearly as important, although this was only a variable factor in BMK and BUY. The effect of distance to a hospital on PHU use was not significant in the entire sample, as had been suggested by the relationship seen in Figure 6.4. Although the difference in distance scales for hospitals (maximum 38 miles) and PHUs (maximum 15 miles) makes this difficult to interpret, it suggests that hospital outpatient clinics are not used as substitutes for a PHU provided the PHU is more conveniently located. Among the preference variables, age was significant, with a high relative likelihood of under-5s using PHUs. The coefficient for severity was zero, indicating that the small difference seen in Table 6.8 was in fact not significant when other factors were controlled. The small variation in PHU use with school attendance seen in Table 6.11 was also not significant. The lack of coefficients significantly different from zero for either ATP variable is inconsistent with the positive value for elasticity with respect to household income seen earlier in Table 7.4. However, the initial logistic regression run resulted in a small coefficient for assets which became insignificant after outliers were removed, suggesting that outlier cases had been responsible for the calculated positive elasticity.

8.3.2 Use of other medical treatment

For 'other medical' use, the time required to walk to a PHU had an even more important positive influence than the negative effect of distance to a hospital. This reinforced the conclusion that PHUs are used out of choice when they are as accessible as a hospital, probably because of the lower cost. The distance effects were about twice as important as any other factors. Age was significant, with adults being the most likely to use this option, and modernity (school attendance) was also a significant positive factor. While the low income elasticity shown in Table 7.4 was confirmed by the absence of a significant coefficient for income, there was

a small positive coefficient for assets. The high coefficient for severity agrees with the high differential for severity seen in Table 6.8.

8.3.3 Use of 'all medical' treatments

Since there were nearly equal numbers of cases in the two categories of PHU and 'other medical', the coefficients for most variables in this model are approximately the means of those estimated for ^{each} taken alone. This makes the results for this model rather meaningless, e.g., for the coefficient for walking time to a PHU: it would be incorrect to say that this factor has such a small (-.056) effect on the use of all medical treatment. It is more appropriate to think of PHU and 'other medical' use as separate options insofar as most of the treatment choice determinants are concerned. The fact that one of the ATP variables has a significant (but small) coefficient while neither PHU use or 'other medical' had is almost certainly due to the larger combined sample size.

8.3.4 Use of drugs

Access to PHUs had a small negative effect on use of drugs and access to hospitals had none, indicating that drugs were not used merely as a substitute for medical treatment when access is poor. However, the type of PHU had a strong influence when access was controlled for, probably because of the much smaller range of drugs available in the MCH units. Age was less of an influence than for medical treatment, but children 5-15 years were relatively most likely to receive these drugs. A 'modern' outlook was weakly associated with the use of drugs. Severity was not a factor, but the specific illness was important. Alone among all of the treatment options, and consistent with the calculated income elasticities in Table 7.4, the coefficient for per capita income was significant.

8.3.5 Use of herbal treatment

Self-treatment with herbs was (negatively) related to access to hospitals, but not to access to PHUs. Since there was a significant negative coefficient for wealth, and there was a similar positive coefficient for 'other medical' use (but none for PHU use), this suggests that herbal self-treatment was primarily a substitute for hospital treatment (but not for PHU treatment) for poorer and more distant households. Modernity was also a significant (negative) determinant, and

the specificity of illness type was high. As with drug self-treatment, children 5-15 were relatively more likely than other ages to receive herbal treatment.

8.3.6 Use of traditional healers:

Poor access to both PHUs and hospitals were the most important determinants of the use of traditional healers. Wealth was negatively correlated, but contrary to the calculated high negative elasticity seen in Table 7.4, the coefficient for income was not significant. The coefficient for severity^{was} small but significant, and the coefficient for illness type was highest of all the treatment options. The fact that 'modernity' did not enter the model for this treatment choice but did for herbs suggests that while people with a 'modern' outlook recognise that Western treatments are more effective than herbs, they still respect the traditional healer's skills, especially for certain illnesses.

8.3.7 Use of no treatment:

Use of no treatment was associated most strongly with non-severity and the type of illness, suggesting that people are aware that certain illnesses are self-limiting. ATP (assets) were also a strong negative factor, but access to medical facilities was not significant.

8.4 Differences between geographic areas

As seen in Tables 8.1a to 8.7e, some coefficients which tended to cancel out to zero for the entire sample were significant when individual geographic areas were examined. Some coefficients for individual areas were statistically insignificant because of the small sample sizes, notably for the use of traditional healers and for 'other medical' in BMK, so comparisons of those models may not be valid.

Table 8.7a: R coefficients for logistic regression models, BMK chiefdom

Dependent Variable: USE:	Preference Variables				Access Variables			ATP Variables	
	Severity	Illness	Modern (school)	Age ¹	Type of nearest PHU	Distance to hospital	Walking time to PHU	Income ²	Assets
PHU	-	.066	.030	.040 (1)	-	-	-.185	-	.028
OTHER MEDICAL ³	-	-	-	-	-.140	-	-	-	-
ALL MEDICAL ³	-	-	.029	.072 (1)	-	-	-.191	-	-
DRUGS	-	.136	-	-	-	-	-	-	-
HERBS	-	.081	-.190	.135 (2)	-	-.039	-	-	-
TRAD HEALER	.117	.210	-	-	-	-	.158	-	-
NO TREATMENT	-.074	.153	-	-	-	-.141	-	-	-

¹The age group having the highest likelihood is coded in brackets: (1) under 5 years; (2) 5-15 years; (3) over 15 years.

²Coefficients were the same for household income and per capita income in all models.

³Only 13 'other medical' cases.

Table 8.7b: Logistic coefficients for regression models, BUY chiefdom

Dependent Variable: USE:	Preference Variables				Access Variables			ATP Variables	
	Severity	Illness	Modern (school)	Age ¹	Type of nearest PHU	Distance to hospital	Walking time to PHU	Income ²	Assets
PHU	-	.046	-	.161 (1)	.103	.043	-.157	-	-.076
OTHER MEDICAL	.109	.144	-	-	-	-.211	.168	-	-
ALL MEDICAL	.084	.053	-	.031 (1)	-	-.183	.086	-	-
DRUGS	-	.215	.115	-	-	-	-	-	.094
HERBS	-	.213	-.101	-	-	.112	-	-	-
TRAD HEALER	-	.120	-	-	-	-	-	-	-
NO TREATMENT	-.128	.140	-	-	-	.055	-	-	-.165

¹The age group having the highest likelihood is coded in brackets: (1) under 5 years; (2) 5-15 years; (3) over 15 years.

²Coefficients were the same for household income and per capita income in all models.

Table 8.7c: Logistic coefficients for regression models, LAN chiefdom

Dependent Variable: USE:	Preference Variables				Access Variables			ATP Variables	
	Severity	Illness	Modern (school)	Age ¹	Type of nearest PHU	Distance to hospital	Walking time to PHU	Income ²	Assets
PHU	-	.144	-	.078 (1)	-	-	-.385	-	.048
OTHER MEDICAL	.049	-	.101	-	-	-.237	.268	.126	-.061
ALL MEDICAL	.035	.102	-	.081 (1)	-	-.115	-.194	.064	-
DRUGS ^a	-	.176	-	-	-	-	.079	.020	-
DRUGS ^b	-	.175	-	-	-	-	.082	.074	-
HERBS	-	.224	-	-	-	.131	-	-.087	-
TRAD HEALER	-	.228	-	-	-	.065	.163	-	-.100
NO TREATMENT	-	.166	-	-	-	.057	-	-	-

¹The age group having the highest likelihood is coded in brackets: (1) under 5 years; (2) 5-15 years; (3) over 15 years.

²Coefficients were the same for household income and per capita income in all models except the one using DRUGS as a dependent variable.

^aUsing total household income as the income variable.

^bUsing per capita income as the income variable.

Table 8.7d: Logistic coefficients for regression models, MAL chiefdom

Dependent Variable: USE:	Preference Variables				Access Variables			ATP Variables	
	Severity	Illness	Modern (school)	Age ¹	Type of nearest PHU	Distance to hospital	Walking time to PHU	Income ²	Assets
PHU	-	-	-	.164 (1)	-	-.191	-.219	-	-
OTHER MEDICAL	.155	.135	-	.062 (3)	-	-	.321	-	-
ALL MEDICAL	.090	.106	-	.085 (1)	-	-.156	-	-	-
DRUGS	-	.221	-	.160 (2)	-	.095	-	-	-
HERBS	-	.248	-	-	-	-	-	-	-
TRAD HEALER	-	-	-	-	-	.107	-	-	-
NO TREATMENT	-.196	-	-	-	-	-	-	-	-

¹The age group having the highest likelihood is coded in brackets: (1) under 5 years; (2) 5-15 years; (3) over 15 years.

²Coefficients were the same for household income and per capita income in all models.

Table 8.7e: Logistic coefficients for regression models, urban areas¹

Dependent Variable: USE:	Preference Variables				ATP Variables	
	Severity	Illness	Modern (school)	Age ²	Income ³	Assets
PHU ⁴	-	-	-	-	-	-
OTHER MEDICAL	-	.055	-	-	-	.041
ALL MEDICAL	.079	-	-	-	.059	-
DRUGS	-	.215	-	-	-	-
HERBS	-	.252	-	-	-	-
TRAD HEALER ⁵	-	-	-	-	-	-
NO TREATMENT	-	.301	-	-	-	-

¹No access variables are shown because there was a hospital and PHU in each urban area.

²The age group having the highest likelihood is coded in brackets: (1) under 5 years; (2) 5-15 years; (3) over 15 years.

³Coefficients were the same for household income and per capita income in all models.

⁴There were only 10 cases using PHUs.

⁵Only 1 case.

8.4.1 Comparison of ATP variables

ATP variables were the most significant in some treatment models in BUY and LAN chiefdoms. In BUY the negative sign of the coefficient for assets on PHU use indicates that PHU treatment was an 'inferior' good, which is consistent with most operational PHUs in the chiefdom being MCH units. BUY was also the only area where the coefficient for an ATP variable in the model for 'no treatment' was significant, perhaps a consequence of the high amounts paid for treatment (seen in Table 6.5a), and the low level of non-farm (i.e., cash) income (Table 7.1). LAN was the only geographical area to have a significant coefficient for an income variable for 'other medical' treatment and for a wealth variable for PHU use. This is probably a combined effect of the considerably lower incomes and lower mean asset score¹ in this chiefdom and an average cost of PHU treatment as high as that in BUY. The use of medical treatment was also associated positively with ATP variables in urban areas.

8.4.2 Comparison of access variables

Access variables were significant in all geographic areas. The high negative coefficient for walking time to PHUs on PHU use in LAN is

¹LAN had the lowest mean score of any area: 1.09 vs. the mean of 1.69.

consistent with the fact that villages farther from PHUs tend to be poorer², so distant villagers were deterred in 2 ways. Distance effects on 'other medical' use were significant in BUY and LAN, but not in MAL (nor in BMK due to small sample size). This was probably because the higher incomes in MAL moderated the deterrent effects of high transport costs, and also because many of the 'other medical' visits in this chiefdom were to a local private practitioner. The cross-effect of distance from a hospital on PHU use was not significant. (The large positive coefficient in MAL is an artefact caused by the coincidence that most of the sampled villages which were far from a hospital were also far from a PHU). The other cross-distance effect, of distance to a PHU on 'other medical' usage, was significant everywhere except BMK. It is worth noting that even where the perceived quality of PHUs was low (in BUY), they were used more than hospitals when they were accessible. Herbal and drug self-treatment increased with distance to PHUs and hospitals, with the higher coefficients in BUY and LAN consistent with the higher observed income sensitivity. The high negative coefficient for 'no treatment' seen in BMK is probably an artefact due to the fact that all sampled BMK villages were nearly the same distance from a hospital, but the village nearest a hospital was one of the poorest.

8.4.3 Comparison of preference variables

Preference variables had significant coefficients in all areas. Under-5s were most likely to receive PHU treatment in all 4 chiefdoms, and in MAL the differences were large enough to identify a pattern of preference: PHUs for under-5s, 'other medical' for adults, and drugs for children 5-15. In BMK, herbal treatment took the place of drugs for children 5-15. Modernity was a significant factor in the use of PHUs in BMK, of 'other medical' in LAN, and of drugs in BUY (where it was also negatively associated with the use of herbs). It is interesting that the pattern of positive sign with a 'Western' treatment (clinical or drugs) and a negative sign for traditional treatment (herbs) was found only in the 2 chiefdoms in Port Loko district. This may be associated with cultural differences between the different majority tribes in these districts.

²Mean household incomes: PHU villages, Le 35375; 0.5-5 miles, Le 29351; greater than 5 miles, Le 31746.

Severity was positively associated with medical treatment in all areas except BMK, possibly because treatment costs were lowest there.

8.5 Differences between income groups

Although the coefficients for income and wealth were especially sensitive indicators in this stage of the analysis because of the narrow range of income in any one group, it is difficult and perhaps deceptive to identify income-related trends when coefficients are small (below about .100). Only the analyses for medical treatment are presented.

8.5.1 PHU use by income group

The coefficients for PHU use (Table 8.8a) indicate that distance to a hospital was less of a factor for higher income households than it was for poorer ones; wealthier households had the option of paying for transport to hospitals that the poor did not enjoy. In addition, the specific illness was much more important a consideration for poorer households. The trends for the ATP variables are too weak to conclude anything about the direct effects of income.

Table 8.8a: PHU treatment model regression coefficients for household income groups

Variable	Household Income Quintile				
	I	II	III	IV	V
Walking time PHU	-.183	-.321	-.272	-.291	-.229
Distance hospital	-.147	—	.083	—	—
Type nearest PHU	.191	.104	.172	.202	.173
Age	.011	.103	.114	—	.124
Type of illness	.144	.104	—	—	—
Severity	—	.101	—	-.092	—
Assets	.051	-.053	—	.065	—
Household income	—	—	—	-.057	—

8.5.2 'Other medical' use by income

The higher coefficients with increasing income for walking time to the PHU (Table 8.8b) again reflect the fact that the wealthy are less likely to walk to a distant PHU than the poor because they would be more likely to use a hospital instead. Hospital and other medical use by the

poor was more likely to be determined by the nature of the illness, but not the severity, than by the rich. ATP variables were not significant in any income group.

Table 8.8b: 'Other medical' treatment model regression coefficients for household income groups

Variable	Household Income Quintile				
	I	II	III	IV	V
Walking time PHU	.140	.248	.115	.278	.292
Distance hospital	—	-.182	-.258	-.172	-.160
Type nearest PHU	-.100	—	—	.070	—
Age	.045	.073	—	—	—
Type of illness	.157	.130	.088	—	.070
Severity	—	—	.212	.127	—
Assets	—	—	—	—	—
Household income	—	—	—	—	—

8.7 An attempt to measure price effects

As discussed in Chapter 2, calculation of price elasticity from cross-sectional data is subject to technical problems which have put some published results in question. In principle, in a regression model in which the dependent variable is the quantity of treatment consumed and the independent variables include price, the coefficient of the price variable is proportional to the price elasticity at the mid-point of the price range. Cross-elasticities are similarly related to coefficients of the prices of other treatments used as independent variables. But for these assumptions to be valid several conditions must be fulfilled, perhaps most important of which in the case of the present research is that the consumer has knowledge of the price of the treatment used and alternative treatments before making the choice. Data from the household survey showed this was not true (although most would have known relative prices, e.g., drugs versus hospitals), and the survey of health facility users found only 6.3% knew how much the treatment would cost before leaving home.

A more common-sense approach to estimating price effects without relying on multiple regression techniques was explored. If a range of

differently priced treatments are easily available to a group of patients, theory predicts that more of the lower-priced treatments will be used, provided they are all perceived as being equally effective. This was tested for the single most frequent illness, malaria, controlling for access by limiting the sample to villages within one mile of a PHU. (Foster (1991) described a hypothetical household decision-making process for malarial illness in which a mother elects to try self-medication when her child has an attack in the hope that the episode will resolve itself. Only when she sees that home treatment is not working will she consider taking the child for professional care, typically with a several-day delay from onset of fever. This entirely plausible scenario adds to the understanding of the price-demand relationship, showing that it is not based only on a static, one-time utility-maximizing decision.)

Because of the high markups at the PHUs, chloroquine and aspirin could be bought from peddlers for less than from PHUs, although a full course of treatment was usually not purchased. It is not surprising that many preferred to do this since the results obtained (Figure 6.2) were similar for both types of treatment¹. Table 8.9a shows that market drugs were cheaper than PHU treatment in all 4 chiefdoms, but drugs were used more frequently (shaded area) only in BUY, where the PHUs were of lower perceived quality or were often closed. This suggests that the two treatments were not in fact perceived as equal in quality, perhaps because many cases of malaria were in infants and children and regarded as potentially dangerous, so high value was placed on the consultation and diagnosis. When the analysis was repeated for headaches and general body pains (usually described as non-severe and usually afflicting adults), a different picture was seen (Table 8.9b), with drugs being used more often (shaded areas) in 3 out of 4 chiefdoms. Given these dissimilarities, it was concluded that equal perception of drugs and PHUs could not be assumed generally, and that any approach to estimating price effects by simply comparing consumption was likely to yield unreliable results for the sample as a whole.

¹ Herbal remedies could have been included in the analysis as a virtually cost-free treatment, but the results obtained were not comparable to those from drugs or PHU treatment.

Table 8.9a: Price and utilization of PHU and drug treatment, for malaria

Chiefdom	Mean cost per episode (Le)		Relative utilization	
	PHU (n)	Drugs (n)	PHU	Drugs
BMK	71.1 (27)	10.7 (22)	41.8%	37.3%
BUY	43.0 (8)	24.5 (24)	13.3%	55.6%
LAN	69.0 (24)	17.9 (10)	64.1%	25.6%
MAL	109.4 (33)	66.8 (15)	56.5%	24.2%

Table 8.9b: Price and utilization of PHU and drug treatment, for headache and general body pain

Chiefdom	Mean cost per episode		Relative utilization	
	PHU (n)	Drugs (n)	PHU	Drugs
BMK	237.5 (9)	14.4 (13)	23.1%	33.3%
BUY	80.0 (3)	45.2 (44)	4.3%	63.8%
LAN	54.8 (27)	14.1 (7)	65.9%	17.1%
MAL	95.4 (11)	63.4 (14)	28.2%	35.9%

8.8 Discussion

The first regression model discussed in this chapter demonstrated that household wealth and income variables accounted for only 5 to 10% of variations in the amounts paid for treatment. This was true concerning both the average amount paid for treatment in a household or the total amount paid during the recall period. For the amounts actually paid, 'ability to pay', as defined as a combination of wealth and income factors, appears to play only a minor role in determining how much is actually paid. There was a somewhat better correlation with the average amount paid than with the total, suggesting that when expenses mount up in a short time, some households have to make more use of borrowing and other methods of obtaining money in order to use medical treatment. The models also showed that the relative importance of wealth and income changed depending on whether the amount spent was obtained outside the house or was available, but since the individual regression coefficients were small and were very sensitive to the wealth indicator used, this could not be considered conclusive.

The logistic regression models of treatment choice used the ATP variables found most significant in the first model, and added the most significant variables in the 2 other factor groups of preferences and access. The results of the logistic regression models provided insights into the individual decision choices involved, with data in a much more compact form than crosstabulations and reducing the chance of erroneous conclusions due to covariance of factors. Separate regression models were estimated for each treatment choice, and estimating the models for subsets of data for different geographic areas and income groups allowed comparisons of partial correlation coefficients to be made. The model for PHU use confirmed the insignificant role played by wealth and income in PHU utilization, but also clearly identified LAN chiefdom as the exception to this, especially for the more expensive forms of medical treatment.

The coefficients for distance variables in the PHU and 'other medical' models helped identify the complex relationships between proximity to a PHU, proximity to a hospital, and income. Rather than proximity to a hospital detracting from PHU use, it appears that nearby PHUs are used in preference to traveling to a hospital. This rule is modified by wealthier households, however, for whom the cost of travel is less of a deterrent. To try to compare the relative importance of groups of factors (i.e., ATP vs. preference vs. access) is to tread on statistically slippery ground, but looking at the orders of magnitudes of the coefficients, most ATP coefficients were less than .1, most preference coefficients between .1 and .2, and most access coefficients were between .2 and .3.

Access to medical facilities was unimportant in the decision to use drugs for self-treatment, and the regression models confirmed the positive association with per capita income but not household income. This unique characteristic among treatment options makes drugs a 'superior' good in economic parlance rather than merely a more affordable substitute for medical treatment for the poor. An image of the decision to use drug self-treatment instead of PHU or other medical treatment emerges: drugs are seen to be effective (Figure 6.2), especially for some common illnesses. They are 'modern'; they are conveniently available if a peddler is in the village, taking less time to purchase than a visit to even a local PHU. In addition, low income elasticity does not preclude a price effect: other

factors being equal, rich and poor alike will choose the least expensive treatment they think will be effective; indeed, households in which money is less relatively subject to the control of the household head (i.e., with more female earners) tend to buy drugs more often.

Summary

In linear regression models of ATP variables, household income and wealth variables were found to account for only 10% of the variation in observed amounts actually paid for treatment. Wealth and income varied in their relative importance depending on whether the amounts paid were available in the household or had to be obtained elsewhere. These differences in the coefficients of the ATP variables were not statistically significant after access and preference variables were included in overall models of treatment choice.

Separate logistic regression models were estimated for each treatment choice, and estimating the models for subsets of data for different geographic areas and income groups allowed comparisons of partial correlation coefficients to be made.

While the models could not positively identify factors which direct the choice of one versus another form of treatment, it is clear that income and wealth play only a small part in these decisions, and that for decisions about medical treatment, access is the most important factor. While it would be useful to know how much the price difference between medical treatment and market drugs affected the choice, price elasticity could not be determined from the available data, and it appeared that other factors affected utilization more than price for some common illnesses.

Chapter 9:

Seasonality Effects

9.0 Introduction

As discussed in Chapter 3, the rainy season in much of the tropics is characterized by increased morbidity, difficult transport conditions, and reduced food supplies and cash availability. Since resources for the rainy season followup household survey were limited, it was decided to focus on the effects of seasonality on PHU utilization, with emphasis on the effect of income fluctuations, and secondarily on the effects of changes in physical access. One chiefdom in each district was chosen (BMK in Port Loko and MAL in Kenema¹), from each of which 3 villages were selected for the rainy season survey on the basis of higher than average PHU utilization in the dry season. Two villages in each chiefdom had community health centres; the third village in each chiefdom was several miles distant from a PHU. A total of 200 households were interviewed by the same team of interviewers used in the dry season survey, using a similar questionnaire. 67% of the households were located in villages with PHUs, with the rest in the more distant villages. An effort was made to revisit the same households that had been interviewed in the dry season round, but 17 new households were added to meet interview targets. This round of the survey was carried out in early September 1990. All seasonal comparisons in this chapter were made with a subset of the dry season household survey that includes only the 6 villages surveyed in the rainy season.

9.1 Morbidity in the rainy season

PHU service statistics from 1988 and 1989 show attendance peaks in June and October with a trough in between, so, while utilization patterns do not reflect only morbidity, it is incorrect to generalize that morbidity in Sierra Leone is consistently higher in the rainy season, which runs from March to October. The changes between morbidity patterns observed in the

¹The preliminary data analysis done in early 1990 did not reveal the extent of differences between LAN and the other chiefdoms. Had this been known, LAN would have been selected for the rainy season survey.

two survey rounds were subtle: as seen in Appendix Table A1.16, there was little change in overall morbidity in BMK (223 cases/1000 in the recall period versus 237/1000 in the dry season), but a sizable decrease was observed in MAL (187/1000 vs. 243/1000 in the dry season). Compared to these overall decreases of 6% and 23%, episodes described as 'severe' dropped by only half as much. Digestive system infections decreased by nearly half in both areas, and respiratory infections decreased to a lesser extent. Malaria was the most prevalent illness in the rainy season, but seasonal effects were significantly different ($p < .02$) in the two chiefdoms: malarial symptoms increased in the rainy season from 57.3 to 82.4/1000 population during the recall period in BMK, but decreased from 74.7 to 60.8/1000 in MAL (Appendix Table A1.17). These differentials emphasize the existence of distinct regional patterns within a country. The drop in intestinal infections was probably due to the availability of better quality drinking water¹. Decreased respiratory problems in the rainy season suggest that they are due in part to the dusty conditions of the rice harvest in Port Loko and to the rigours of mining in Kenema, and may also be associated with the lower prevailing temperatures during the harmattan (dry north winds prevailing from December through February). These observed seasonal variations are perhaps counter to conventional assumptions.

9.2 Inflation, availability of money, and expenditure on treatment

High inflation, largely due to devaluation of the leone, has been a fact of life in Sierra Leone since the early 1980's, a fact which complicates a longitudinal study of household economic decisions. Between the two rounds of the survey the official exchange rate increased from 65 to 176 leones per \$US, and the black market rate rose from about 100 to 210 per \$US, an increase of 110%. The official consumer price index (CPI) increased from 14,705 in December 1989 to 26,890 in September 1990, an increase of 83%. As mentioned in Chapter 4, inflation in Sierra Leone has been largely driven by devaluation. For the purpose of calculating changes in real prices between the survey rounds, a value between the price

¹The peak incidence of diarrhoea is at the beginning of the rains when contaminants are flushed into water sources.

inflation and the devaluation rates of 90% has been used as a deflator here.

While price inflation undoubtedly works hardships on households, it does not necessarily result in reductions in consumption of essential goods. In rural health zones in Zaire user charges were adjusted upwards in a such a way that their inflation-adjusted prices remained approximately constant over time, but such price increases were not found to have had a negative effect on PHC utilization (Bitran 1988d). As seen in Table 9.1, the prices paid for most treatment options in rural Sierra Leone increased between the two survey rounds at a rate comparable to overall inflation. In June 1990 (between the two survey rounds) the official prices for essential drugs dispensed at PHUs were increased by 100% over previously established prices, reflected in prices shown paid for PHU treatment¹. Overall price increases for medicines, services and transport are reflected in the costs of other providers. The price of drugs from peddlers increased at about same rate as the price of drugs at the government PHUs, so remained lower by the same ratio.

Table 9.1: Prices paid per case for different treatment options (including travel costs)

	Dry Season		Rainy Season		Price Change (current leones)
	Median paid (Le)	N	Median paid (Le)	N	
Government hospitals	580	5	1120	5	+93%
PHUs, BMK chiefdom	65	120	185	71	+184%
PHUs, MAL chiefdom	100	114	200	58	+100%
Mission hospitals	600 ¹	16	1950	22	+225%
Traditional practitioner	40	9	80	20	+100%
Government staff seen privately	110	20	400	11	+263%
Drugs from peddlers	20	117	48	114	+140%

¹Median travel costs were Le 190 in the dry season and Le 800 in the rains.

¹The variation in dry-season prices and different increases suggest that enforcement of uniform official prices for drugs became more effective after the price increase.

9.1.1 Household demographics and annualized incomes

Household demographics from the 2 survey rounds were similar in terms of household composition, except that households in both chiefdoms had increased by an average of nearly one adult, probably in response to the greater need for farm labour during the rainy period. Calculating household incomes for the previous 12-month period the same way as done for dry season data yielded incomes that were higher in real terms (i.e., both using dry season leones) in the rainy season survey by an average of 34%. This was due mostly to the increased adult population per household, which raised the number of economically active household members from 2.12 to 2.63 per household. In addition, rice farmers in BMK reported a significant increase in seed planted over the previous season and tree crop farmers in MAL reported larger harvests than in the dry season survey. Farming income increased proportionally more than non-farming income in BMK, while the opposite was true in MAL, where there was an increase in the numbers of petty traders and miners per household.

9.1.2 Actual availability of money on hand

The recalculated annualized incomes do not reflect the immediate cash availability in the households at the actual time of the survey, however. In both survey rounds the question of seasonal differences in availability of money was explored by asking a sub-sample of household heads to identify the months they had most and least money on hand, and how much they had in their pockets at those times. There was general agreement about which periods constitute the dry and which the 'hungry' seasons, and about two-thirds were able to give an answer to the question about money on hand. Mean and median amounts for geographic areas and income groups are shown in Table 9.2, which indicate large differences in seasonal availability of money for all groups. Although there could have been misrepresentation for various reasons, the amount reported on hand correlated well with household income groupings. Cash is 'built up' after the harvest, and is spent down as the rains approach, with a decrease in availability of the order of a factor of 10.

The question asked was not how much was available at the time treatment was needed, so the responses reflected the household heads' estimate of how much they usually had on hand in either season. Still,

choice of treatment was strongly associated with the amounts which household heads claimed to be in their pockets during the dry season (Table 9.3), with those using 'other medical' treatments having the highest amounts in pocket, although in the rainy season PHU users had lower amounts than those using drug treatment ($p < .01$).

Table 9.2: Money available as reported by household heads of different geographic areas and income groups, by season. (Data for both seasons is from the full household sample in the dry season household survey)

Group ^a	IN POCKET DRY SEASON (leones)		IN POCKET RAINY SEASON (leones)	
	Mean	Median	Mean	Median
BMK chiefdom	1257	550	153	20
BUY chiefdom	2293	1000	102	80
LAN chiefdom	2984	1500	369	80
MAL chiefdom	2681	400	177	10
URBAN	4615	1000	149	35
Household Income I	1157	600	61	16
Household Income II	2096	800	91	35
Household Income III	2629	500	170	50
Household Income IV	2452	1000	180	40
Household Income V	4489	2000	486	90
Per Capita Income I	1343	900	85	20
Per Capita Income II	1498	550	137	20
Per Capita Income III	3605	2000	305	80
Per Capita Income IV	2851	1000	274	45
Per Capita Income V	3079	1000	166	40

^aDifferences in group means were significant at the $p < .05$ level only for household income

Table 9.3: Money available as reported by household heads according to treatment used, by season.

Treatment Used	IN POCKET DRY SEASON (leones)		IN POCKET RAINY SEASON (leones)	
	Mean	Median	Mean	Median
PHU	2352	1000	276	40
OTHER MEDICAL	3426	1500	261	80
SELF-TREAT WITH DRUGS	3001	1000	295	80
SELF-TREAT WITH HERBS	1302	400	85	20
TRADITIONAL HEALER	1238	900	167	50
NO TREATMENT	1046	400	98	20

A graph of the cumulative amounts the household heads claimed to have on hand in the two seasons (Figure 9.1) indicates that in the dry season approximately 20% had less than the median cost of PHU treatment (70 leones) on hand and 25% had less than the mean amount (133 leones)¹. In the rainy season 60% had less than the median, and 75% had less than the mean cost of PHU treatment.

Comparing the data from the dry and rainy season survey rounds, in December 1989/January 1990 the median responses were Le 100 on hand before the harvest and Le 2000 after the harvest. In September 1990 the respective answers were Le 200 and Le 2500 (Table 9.4 compares the two survey rounds). The exact meaning of these figures is difficult to interpret because respondents were asked to recall amounts for a period when the CPI was lower², but it seems certain that most households had far less cash available during the rains. Given that fact, it is significant that average spending on treatment during the rainy season stayed high in real terms. The median amount spent per illness episode for all treatments used increased from Le 40 to Le 80, and the mean aggregated amount spent

¹The graphed data is based on the dry season survey, with all amounts reported in dry season leones.

²Responses to Q15 and Q16 in focus group #1 (Appendix 4) suggest that it takes a long time for people to adjust their concepts to current price levels in terms of what is cheap or expensive, even though nearly everyone is aware of the current price of a cup of rice. One man said if he took Le 1.00 from the money he had at home he would have a hard time replacing it—rather difficult to accept when a cup of rice cost Le 12.00, unless he had no source of income whatsoever.

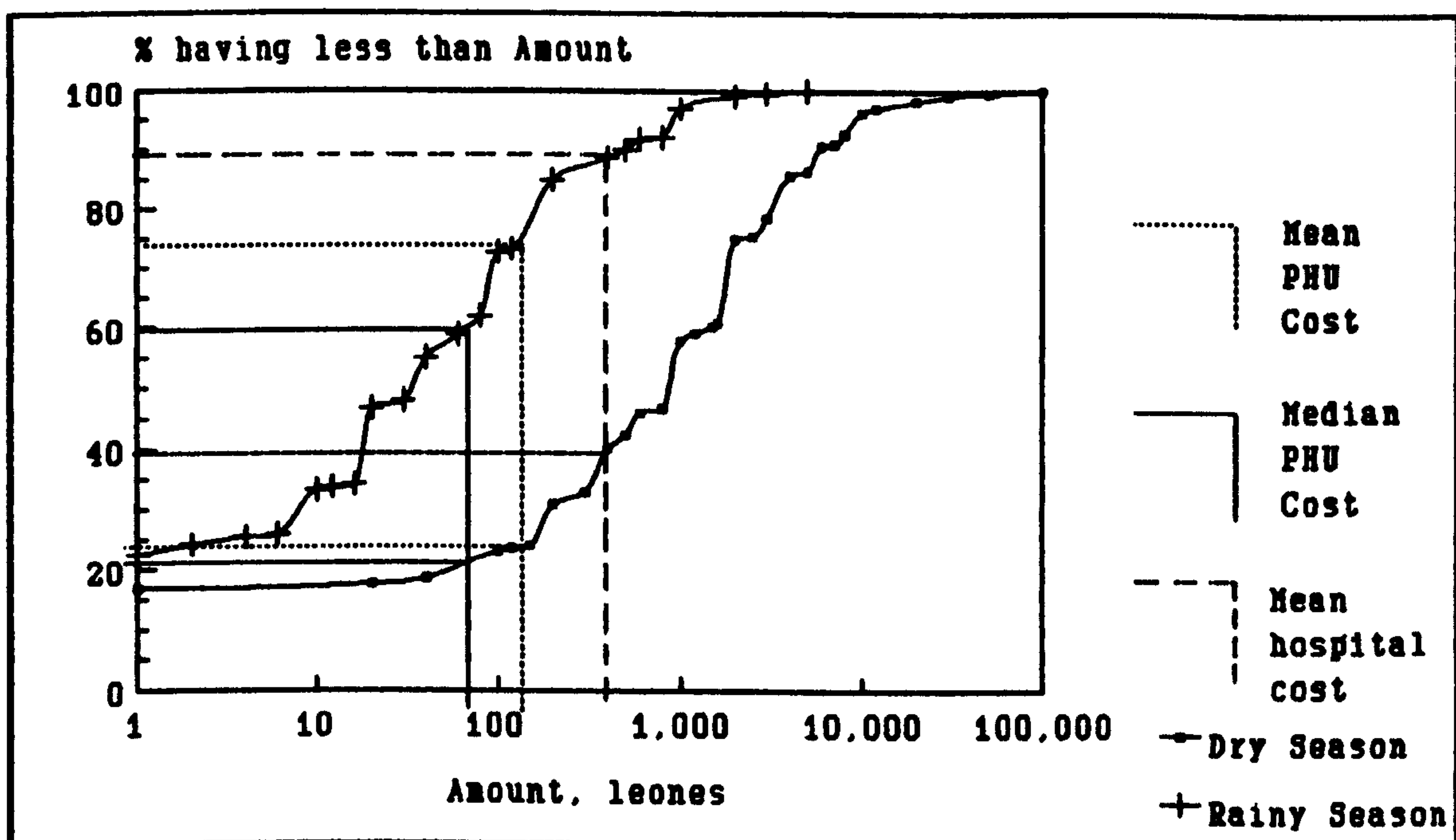


Figure 9.1: Money reported to be in pocket by household heads by season (from dry season survey).

per household in the recall period increased from Le 425 to Le 825. These increases closely mirrored the inflation rate. Table 9.4 compares the reported amounts in pocket from the villages surveyed in the 2 survey rounds, and compares the mean and median amounts reported, by chiefdom. In both surveys, amounts reported available in the rainy season were roughly 10% of that available in the dry season. Respondents in the rainy season survey were somewhat more optimistic about the amounts they usually had in pocket in the rains, with the medians rising from 35 to 200 in BMK and from 0 to 200 in MAL.

Table 9.4: Comparison of amounts reported in pocket in the two survey rounds, by chiefdom

	BMK chiefdom		MAL chiefdom	
	In pocket DRY SEASON (Le)	In pocket RAINY SEASON (Le)	In pocket, DRY SEASON (Le)	In pocket, RAINY SEASON (Le)
As reported in DRY SEASON SURVEY:				
MEAN AMOUNTS	1061	99	3500	254
MEDIAN AMOUNTS	500	35	400	0
As reported in RAINY SEASON SURVEY:				
MEAN AMOUNTS	4168	321	10633	846
MEDIAN AMOUNTS	2000	200	4500	200

9.3 Seasonal Changes in Utilization of Treatment Options

In both chiefdoms the major seasonal changes were decreased use of PHUs and a nearly equal increase in the use of market drugs for treatment of illness, as shown in Table 9.5.

Table 9.5: Choice of treatment options by season and chiefdom¹

	BMK CHIEFDOM		MAL CHIEFDOM	
	Dry	Rainy	Dry	Rainy
PHU	39.0%	29.5%	41.9%	34.3%
Other Medical	2.6%	5.4%	15.1%	15.4%
Drug Self-Treat	26.3%	33.2%	25.4%	35.5%
Herbs Self-Treat	23.4%	18.7%	9.2%	7.1%
Traditional healer	1.6%	6.6%	1.5%	3.0%
None	7.1%	6.6%	7.0%	4.7%
Total	100.0%	100.0%	100.0%	100.0%

The relative change in the utilization rate for PHU treatment (in visits per illness episode) was -25.2% in BMK and -28.2% in MAL. The compensation by increased use of self-treatment with drugs suggests that

¹Although the patterns in the two chiefdoms were similar, the changes in relative utilization were statistically significant in BMK ($p=.0021$) but not in MAL ($p=.1709$).

economic factors, i.e., price increases, decreased availability of money, or the increased cost of time during the rainy season, were partly responsible for the decrease in medical treatment, with changes in access accounting for the rest, since presumably preference factors did not change. Without data from the following dry and rainy seasons it is difficult to tell if the change in PHU utilization was primarily a result of a seasonal drop in the availability of money or of failure to adapt perfectly to long-term inflation. However, given the evidence that people compensate for long-term inflation, it was assumed that seasonal income fluctuation, or more precisely, sharp decreases in money in hand, was the more important.

As shown in Table 9.1 the real price increase in BMK was nearly twice that in MAL, but relative utilization actually dropped more in MAL. This suggests that the decrease was much more a consequence of decreased cash availability (since there were approximately equal decreases in both areas) than increased price. It is difficult to infer much more than this due to the nature of the data.

Table 9.6 shows a greater effect of distance on PHU use in the rainy season than in the dry season. The relative decrease in distant villages was 30%, compared to 21% in the villages for which access to a PHU was not a problem. About 1/3 of the decrease in distant villages would therefore seem to be due to reduced accessibility (because of heavy rain, poor roads), with the rest due to other factors. However, the distant villages had significantly lower mean household incomes (Le 35830 vs Le 52031), so part of the utilization difference (30% vs. 21%) apparently due to distance could have been a result of this income difference. The greater drop in drug utilization may reflect the income difference, but could have also been due to fewer visits by drug peddlers to the village during the rains. Use of 'other medical' treatments increased, and was not affected by distance to a PHU.

Table 9.6: Seasonal changes in PHU and drug utilization, by distance from PHUs

	RELATIVE UTILIZATION RATE		
	DRY SEASON	RAINY SEASON	% CHANGE
PHU - VILLAGES NEAR PHU	42.7%	33.8%	-21%
PHU - DISTANT VILLAGES	30.7%	21.5%	-30%
DRUGS - VILLAGES NEAR PHU	25.8%	29.0%	+12%
DRUGS - DISTANT VILLAGES	26.3%	25.3%	-4%
OTHER MEDICAL - NEAR PHU	7.5%	8.5%	+12%
OTHER MEDICAL - DISTANT FROM PHU	12.3%	13.9%	+13%

9.3.1 Effect of income on utilization

To isolate the effect of distance from the PHU from income effects, the relative utilization only in villages near a PHU was examined (Figure 9.2). Household income appeared to be a somewhat more important determinant of utilization of PHUs and other medical treatment in the rainy season (dotted lines) than in the dry season, but the trend in the dry season was unclear. The correlation between income group and PHU utilization rate during the dry season (solid lines) was not significant, but it was in the rainy season (correlation coefficient = 0.61, $R^2 = 0.37$). This income effect was small though: the slope of the regression line for this relationship indicated an increase in utilization of only 2% per income quintile.

Referring to the problem of determining the true distance effect because of the confounding effect of an income differential between near and distant villages, the income difference (52031 vs. 35830 leones) was equivalent to slightly more than one income quintile, so since utilization decreased by 2% per quintile, 2% to 3% of the observed drop in utilization apparently due to distance was probably due to this income differential. The actual seasonal distance effect thus produced a decrease of 7% in PHU utilization (a quarter of the total drop), with the rest being due to reduced availability of money and other factors.

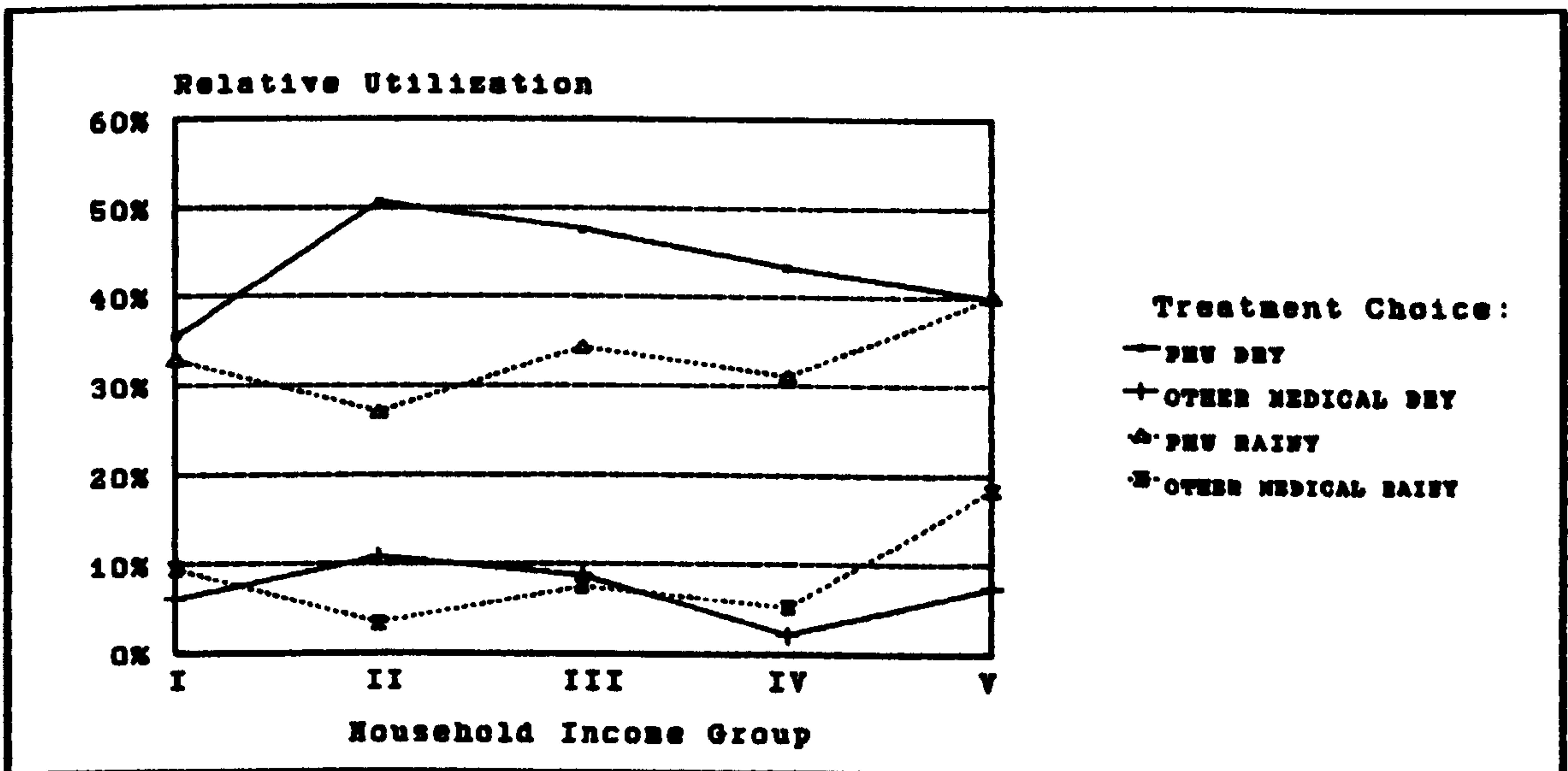


Figure 9.2: Relative utilization of PHUs and 'other medical' by income group by season, for villages close to a PHU (BMK and MAL chiefdoms).

9.4 Reported availability of money in the rainy season

Despite the lower reported amount of money in pocket during the rainy season, for any amount actually paid for treatment money was available at home in a higher percentage of cases than in the dry season (Figure 9.3; the x-axis groups are seasonal quartiles for amounts paid). There was an

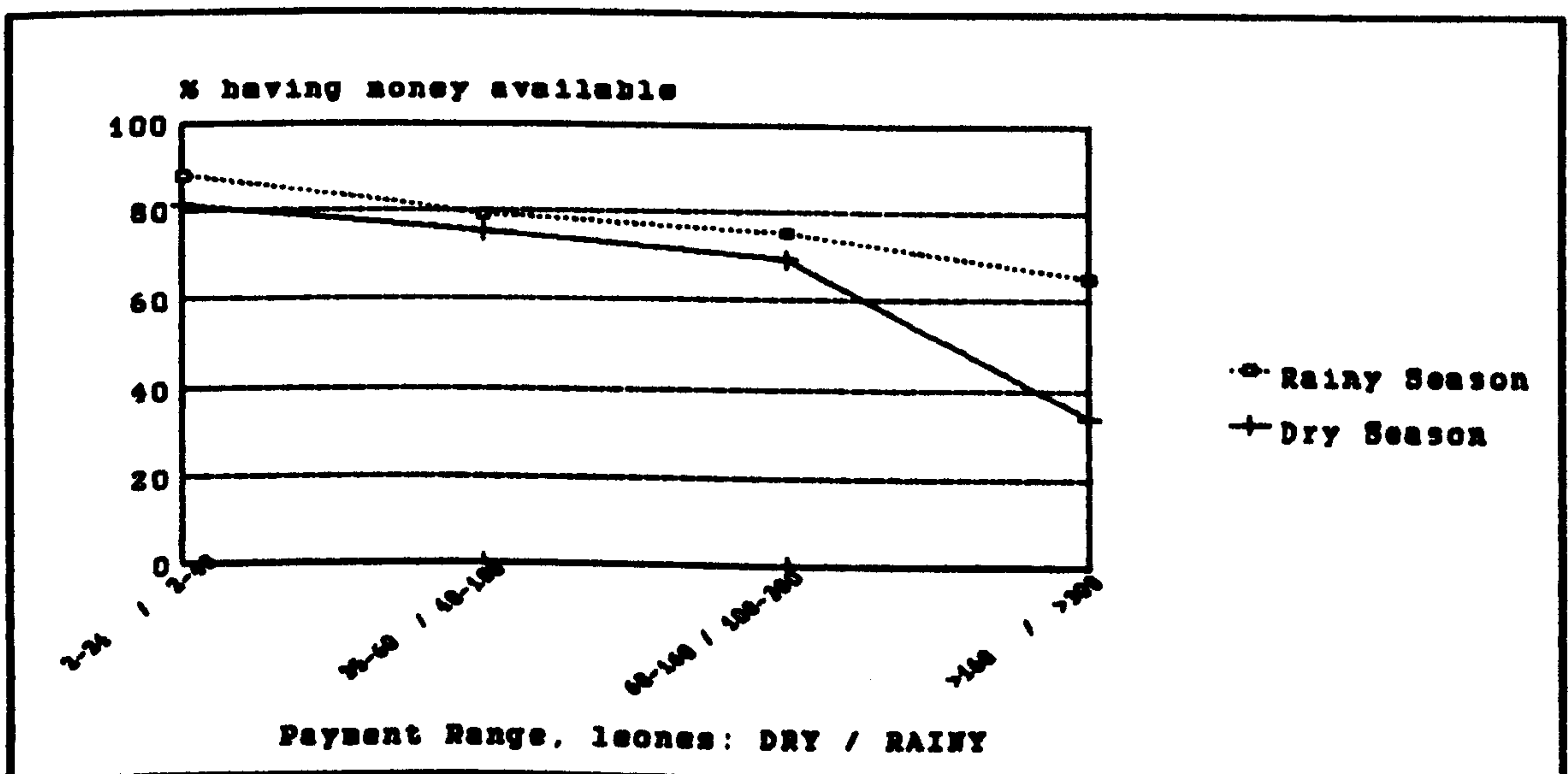


Figure 9.3: Cases having money available by amount paid (quartiles) and season

especially dramatic improvement in the availability of higher amounts. In addition, a higher percentage of households in every household income group

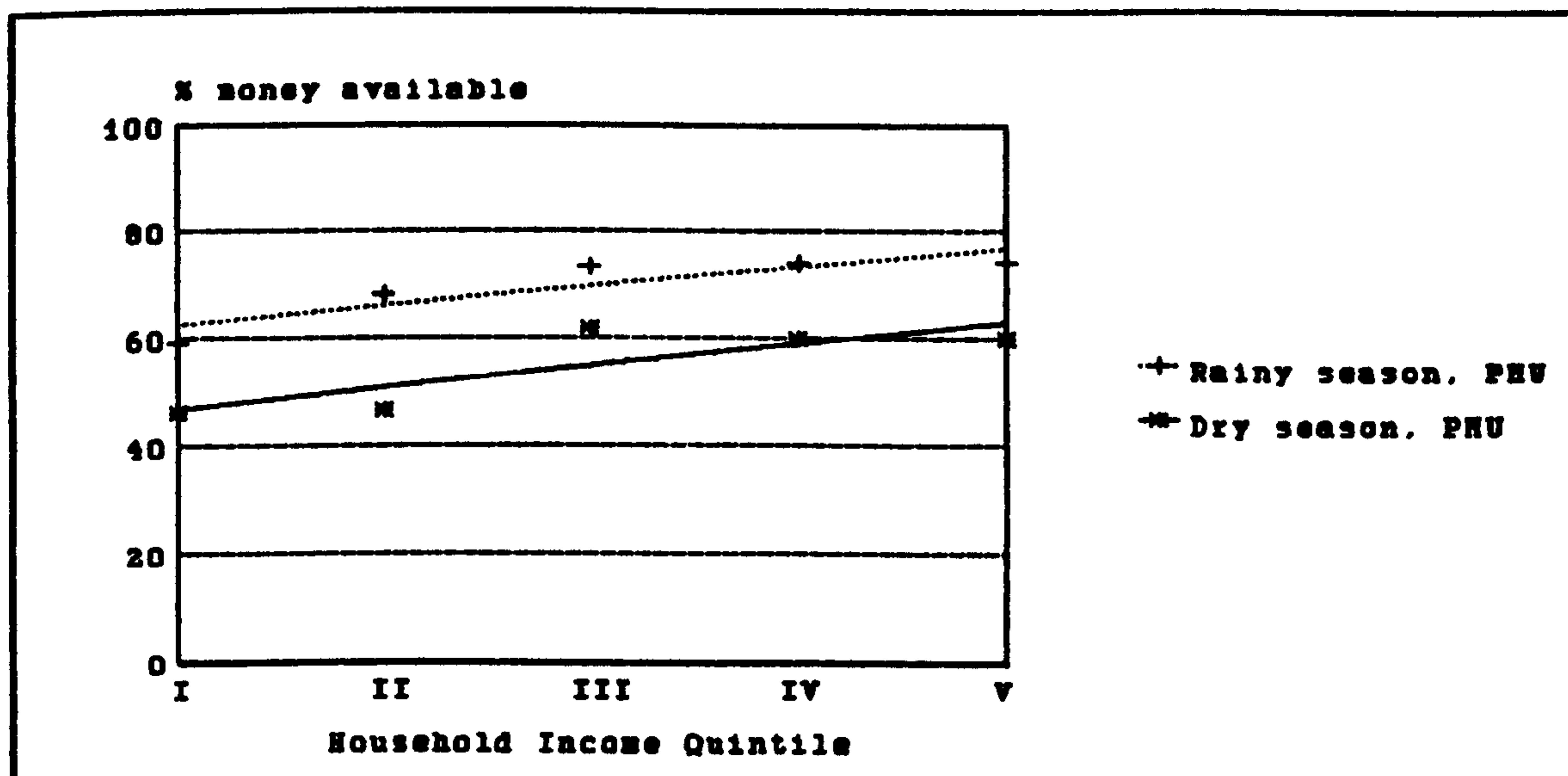


Figure 9.4: PHU cases having money available by household income group and season

had money available for PHU treatment in the rainy season (Figure 9.4). The proportion of those with money available for drugs remained nearly unchanged. This unexpected finding could mean that the 1990 hungry season was less severe than usual and that people were willing to use what cash reserves they had to pay for treatment. Evidence that hungry season conditions are not always severe comes from Stephens (1988), who did not observe widespread acute malnutrition during a rainy season survey in neighbouring Liberia, even though rice was reported to be scarce by many households. Other possible explanations are that the dry season survey had found people especially short of cash because of traditional heavy expenditures (by Moslems and Christians alike) at the Christmas period, or that by early September the worst of the hungry season was already over (about 30% of respondents said their cash-poor season was over in August, 26% September, and 22% October).

The data suggested that when money was not available, more cases used methods to obtain it that risked potential adverse effects, but there were too few to be statistically significant, and in any event no 'high risk' methods were used to pay for PHU treatment.

The proportion of users of non-medical treatment who said they did so for financial reasons decreased from 54.3% in the dry season to 37.8% in the rainy season, resulting in a 'financial deterrence' rate of 22.2% of cases (compared to 34.3% in the dry season). The proportion giving distance or lack of transport as the main reason increased, but the greatest change was for cases in which the illness was not thought to be serious or who recovered soon, which increased from 11.9% to 26.7%. This again suggests that economic and health conditions were not very severe during the 1990 rainy season, although the percentage of 'severe' cases reported was virtually unchanged from the dry season.

9.4.2 Logistic regression models of rainy season treatment choices

Identical logistic regression models were run on the dry and rainy datasets (Table 9.7). No significant income coefficient was found for PHU use in either season. Income was significant for 'other medical' use in the rainy season, however. The absence of a severity factor in the rainy season may reflect the fact that the distinctions were blurred by the high proportion of 'other medical' cases which were severe in the rainy season (82% vs. 71%). The increase in the coefficient for walking time for PHU use is consistent with the observation of greater sensitivity to distance in the rainy season. The larger drop in the coefficient for distance to hospital on hospital use and large increase in the income coefficient is probably an artefact resulting from very high income in the village farthest from a hospital.

Table 9.7: Seasonal differences in R coefficients of logistic regression models (BMK and MAL combined)

Dependent Variable: USE:	Preference Variables				Access Variables		ATP Variables	
	Severity	Illness	Modern (school)	Age ¹	Distance to hospital	Walking time to PHU	Income ²	Assets
PHU DRY	-	.066	-	.075 (1)	-.060	-.050	-	-
PHU RAINY	-	-	-	.105 (1)	-.043	-.059	-	-
OTHER MED DRY	.120	.171	-	.062 (3)	-.296	-	-	-
OTHER MED RAINY	-	.159	-	-	-.186	-	.126	-
DRUGS DRY	-	.153	-	-	.063	-	-	-
DRUGS RAINY	-	.185	-	-	-	-	-	-

¹The age group having the highest likelihood is coded in brackets: (1) under 5 years; (2) 6-15 years; (3) over 15 years.

²Coefficients were the same for household income and per capita income in all models.

9.5 Discussion

The results of the rainy season survey showed that morbidity was not higher than in the dry season as expected, but that utilization of PHUs did decrease disproportionately. Although there were increases in treatment price due to inflation and a real price increase in one chiefdom, since money was reported to be much less plentiful by household heads, most of the drop in utilization was presumed to be due to the seasonal effect of lower availability of cash. Drugs, a cheaper form of treatment, were used more often: all signs point to greater financial stress. Access is assumed to be worse in the rains, and an increased negative effect on PHU utilization was in fact observed. Since the discussion of availability versus utilization in section 7.6.2 suggested a strong relationship between availability of money and use of medical treatment, there is an apparent contradiction in finding greater availability of money at home for those who used the PHU and other medical treatments, the lower reported rate of being deterred for lack of money, and the increase in the use of more expensive medical treatments in the rainy season. This can be explained if people were more reluctant to borrow or obtain money in other ways in the rainy season, leaving those who did have the money to use medical treatment. Borrowing rice (from those who have remaining stores) is in fact

said to be much more prevalent in the rainy season (Richards 1986; focus groups), but cash may simply be harder to obtain.

PHU utilization dropped by nearly the same percentage in both BMK and MAL, but the price increase in BMK was much greater. As seen in Table 7.8, MAL had the highest prices with respect to income of all the surveyed areas. Despite having the highest income of the rural chiefdoms and high utilization of PHUs, the greater response to the smaller price change in MAL may indicate that prices were close to being too high in the dry season, and the reduced cash availability in the rainy season sifted out many households that had less than the price of treatment available and could not obtain the rest because entire communities were cash-poor. This is consistent with a higher proportion of users of medical treatment reporting that money had been available. The lower reported rate of financial deterrence by non-users could be due to a change of perspective in the rainy season: when it is raining hard and there is rice to be planted, an illness that would seem serious enough to go to a PHU for in the dry season might appear less serious, and the question of whether there is enough money on hand might never arise.

Summary

There was a decrease of about 30% in the specific utilization of PHUs and overall medical treatment observed in the rainy season followup survey. About 1/3 of this decrease was determined to be due to poorer physical access, while the remainder was most likely due to reduced availability of money. The fact that more people using medical treatment had the money available at home, and that fewer were deterred from medical treatment for financial reasons stands in contrast as a paradox unless it can be explained by greater reluctance or inability to borrow or obtain money in other ways. Perhaps as a result of this, the differential in utilization between poor and wealthy households was observed to increase in the rainy season, especially for the more expensive medical treatments.

Chapter 10:

Discussion of Equity and Affordability Findings and Policy Implications for Sierra Leone

10.0 Introduction

This chapter reviews the major findings of the household survey data analysis, introduces supplementary data to illuminate further the findings, and identifies the most important conclusions in terms of relevance to policy decisions about pricing PHC services for equity, affordability, and efficiency.

10.1 General treatment choice behaviour

Medical treatment was chosen in about 35% of all illness cases, with the rest using self-treatment with drugs or herbs, traditional practitioners, or no treatment. Wide variation in the mix of choices was seen in the different areas studied, with PHUs used more than more expensive private practitioners and hospitals when they were nearby and offered a good range of curative services. Drugs purchased from market vendors or peddlers were usually cheaper than PHU treatment and used more often. Herbal remedies costing little were also frequently used. If the results obtained from treatment are an indication of their perceived quality, market drugs and PHU treatment were nearly as well regarded. If the first action taken did not produce a cure, a different type of treatment was usually tried the next time. There was no apparent bias against or mistrust of medical treatment, and there seemed to be some recognition that certain problems were 'hospital sickness'. In severe cases hospitals and private practitioners were used more often, and medical treatment was heavily used in severe cases when life was evidently in danger. Market drugs were used when not enough money was available or obtainable, but also more for certain problems for which they were known to be effective, such as general body pain or fever. Herbal remedies were also effective for certain problems, but were used more by poorer households. Traditional healers were used for specific (often chronic) ailments, and no treatment was used infrequently, though more often in

cases perceived to be self-limiting, and when no money could be found for treatment.

10.2 Equity: the relative importance of SES and location

The relative importance of independent household variables were compared by using multiple regression models. The model for ATP factors showed that variations in the actual amount paid depended relatively little on household income and wealth variables. Each treatment choice was modelled individually, with the factor coefficients showing that access to facilities was relatively more important than various preference variables, which were in turn more important than socio-economic variables.

10.2.1 Vertical equity of PHC charges

Low income was associated with lower use of private practitioners and hospitals in most geographic areas. For PHU treatment, there was an apparent positive association between household income and utilization in Kenema district, where PHU prices were high compared to income (a single visit cost 0.18% of annual income), but not in Port Loko district where prices were lower (0.07% to 0.13% of income). However, after controlling for other variables, this relationship was statistically significant only in LAN, the poorer of the 2 Kenema chiefdoms. This was the only clear evidence of lower PHU utilization by the poorest groups, but the rainy season survey found a greater drop in utilization in MAL (the wealthier Kenema chiefdom) than in BMK, despite a greater real price increase in the latter chiefdom, suggesting that the dry season prices in MAL were near a threshold where utilization would be affected by further increases. This is tentative evidence that such a deterrence threshold exists, somewhere between 0.12% and 0.18% of annual income for a single PHU visit.

In the entire sample, there was only a small difference (32% vs 39%) in the use of medical treatment between the richest and poorest household income groups, but a higher percentage of the poorest groups was deterred from using medical treatment for financial reasons, making the differential in terms of the proportion of cases that used non-medical treatment because they did not have enough money 35% for the poorest versus 24% for the richest. However, by this criterion there was no statistically significant

difference between the 4 lowest household income quintiles - only the richest quintile was significantly less affected. When the effect of different morbidity rates was included, there was a 1.7:1 ratio between the lowest and highest income groups in the likelihood a given individual would have to use non-medical treatment due to lack of money, but the average rate of deterrence was only 4.6%.

The immediate availability of money in the household seemed to be a more critical determinant of choice than actual income, although the two were related (Figure 7.11). Availability of money appeared to be a random event, with the probability at any given time of having enough on hand only slightly higher in richer households than in poorer ones. In the nearly half of all cases that had to obtain money for treatment outside the household, again it was the poorest 80% of households that ran a similar higher risk of adverse economic effects due to the methods they used to obtain it, especially for the higher amounts paid for hospitals and private providers (Figure 7.12).

These deterrence and risk differentials were statistically significant but rather small, so whether they represent equity differences which should be redressed by pricing policy is an open question. Furthermore, there were important differences between deterrence from PHU use and the more expensive forms of treatment. Relative PHU use was virtually identical for all income groups, in part because there was no significant difference in availability of money for treatment between income groups in the PHU price range (Table 7.13). The regression model for PHU use demonstrated fairly convincingly that SES was not an important determinant of use, except in the poorest chiefdom.

10.2.2 Mistaken expectations of cost

Part of the reported 'financial' deterrence was probably due to erroneous expectations of the cost of PHU treatment. Health committees were functioning in very few communities, and PHU staff did not go to great lengths to make the official prices known. (Q41 in focus group #1 provoked a discussion of the need to know the correct prices.) Because of the system of variable charges (i.e., based on the actual cost of prescribed drugs) used in nearly all government and private health facilities, it was

not surprising to find that only 6.3% of users interviewed at health facilities¹ actually knew how much the charge was going to be. Official PHU charges had been introduced only recently, and 3/4 of those who were financially deterred and used non-medical treatment thought the cost of PHU care would have been more than the actual median price of PHU treatment, with no significant differences between income groups or geographic areas. The expected cost levels that they reported and that deterred them were much closer to the levels paid for treatment at hospitals (Figure 6.1). When people spoke of not being able to afford treatment (focus groups #1 and #2), they invariably referred to expensive operations or the high cost of transportation or its unavailability in emergencies.

This high level of misinformation warrants further comment: even in the nearly total absence of public media, it would be expected that someone who wanted to know the cost of visiting a PHU would ask around the village in case a neighbor had had recent experience. Perhaps the reason why this apparently does not happen is the reputed value placed on secrecy, or at least privacy, in rural Sierra Leonean culture. Secret societies are in fact the central cultural tradition (Islam is by comparison a casual adjunct), and on the personal level it is often said that a person's financial affairs are his own concern. This probably is true even in the extended family, as implied in focus group #1 (Q35). Given this high degree of misinformation, it is plausible that as many as a third of cases apparently deterred from medical treatment might have had enough on hand or could have obtained enough for PHU treatment. In the discussion of corrections to financial deterrence (Chapter 6) it was seen that 9% of these cases had in fact spent more than the median price of a PHU visit. Figure 9.1 showed that in the dry season while perhaps 40% had less^{on hand} than the Le 600 mean price of hospital visits, only 25% had less than the mean cost of a PHU visit. Lower expected amounts would also encourage more people to try to obtain money when they do not have it: if rice had to be sold to raise money, the difference between the expected and actual amounts could equal several days of rice consumption for an entire household.

¹From the facility user survey (this was one piece of information which was not affected by the selection bias).

10.2.3 Affordability

If the income estimates were correct, the mean price of a single PHU visit (Le 133) was well over twice the often-used benchmark of a day's agricultural wage, although this varied from one chiefdom to another. However, households are fairly large, usually have more than one earner and resources are pooled to an extent, so at 0.13% of total annual household income (half of the entire household's daily income), a single PHU treatment might well be seen to be 'affordable' by the average household, at least in comparison with the price of 'other medical' visits of 0.41%. However, the cost of a single PHU visit represented 0.54% of total annual household income for the lowest household income group, a level which might understandably shift consumption to palliative market drugs, the average purchase of which cost the poorest only 0.18% of total household income. The focus groups reinforced the impression that treating illness was a very high priority: if money is on hand or can be obtained easily it will be spent on whatever treatment is considered necessary. The relationship of price to the amount on hand or which can be raised quickly may influence the choice of treatment as much as that of price to annual income (if indeed income is known at all).

10.2.4 Medical need

Whether the observed degree of deterrence is significant from a policy point of view also depends on the objectives of the PHC programme, which include general coverage targets and reductions in overall and child mortality. The mortality data from the household survey are suggestive of differentials between income groups, but the sample size was too small for differences in any of the mortality rates shown in Table 10.1 to be statistically significant at the $p=.05$ level. Thus, while there could be an association between SES and specific mortality rates, it cannot be proved conclusively from the available data, nor can it be demonstrated that higher mortality was due to lower use of medical treatment.

Table 10.1: Mortality rates by income group (per 1000 per year)

	Household Income Group				
	I	II	III	IV	V
Infant deaths	202	157	186	191	223
Under-5's	113	83	156	97	94
All ages	50.0	41.3	42.7	42.8	35.4

10.2.5 Aggregate household expenditures on treatment

A more serious problem of vertical equity is represented by the cumulative financial cost of illnesses over time in the household. Over the course of a year, households spent on average 6.9% of total income on treatment (Tables 7.5 and 7.6). Whether this level is 'affordable' is a question that perhaps cannot be answered. Certainly it is not budgeted for and put aside, although this is done for some types of expenses, such as initiations. Illnesses are not the only kind of emergency expenditure to confront a household: 45% of all households had large unexpected expenses in the previous year which averaged nearly Le 3000 (2.9% of income), with funerals and court cases as frequent as major illnesses and accidents. But while these events might not be rare, most households said they would cope with them by borrowing. Of even greater concern is the fact that the aggregated expenditure on treatment represented 25.6% of income for the poorest 20% of households, which are reputed to spend from 70% to 80% of income on food (Lipton 1988). While income is redistributed through gifts to a certain degree, most transfers for health expenditures involved debt in one form or another. Unlucky farmers who pledge crops or farms have been known to lose these assets, and high health care costs could cause this to happen if debt piles up at a rate of 25% of income per year. However, while the preliminary survey of the NHIES (CSO 1988) found an average of 72% of income spent on food in the predominantly urban Western Area, the final NHIES data for the rural areas surveyed (Table 10.2) suggest that it is closer to 50%, varying little with the number of earners per household (because of assumptions made in the income calculations in Chapter 7, this proxy would correlate well with total household income). While it is unlikely that there is much slack (clothing and shoes were perhaps the largest category which could be reduced in an emergency) in all

but the highest household budgets, there would be less danger of adverse nutritional effects than if the proportion spent on food were higher.

Table 10.2: Selected household budget components from the NHIES, Port Loko and Kenema rural areas

	Kenema district (rural)			Port Loko district (rural)		
	1-2 earners	3-4 earners	>5 earners	1-2 earners	3-4 earners	>5 earners
Rice, cereals as % of food expenditures	28.2%	30.5%	37.2%	38.7%	47.5%	43.8%
Food, drink as % of total expenditures	51.1%	59.4%	47.6%	52.0%	52.4%	51.3%
Medical as % of total expenditures	3.8%	6.3%	6.8%	2.4%	3.6%	2.4%
Shoes, clothing as % of total expenditures	7.2%	9.4%	13.2%	13.5%	15.4%	14.5%

10.2.6 Impact of 'other medical' treatment costs

The differential between lowest and highest income groups in terms of percentage of household income spent on treatment is nearly 6:1 (Table 7.6), compared to the deterrence differential of 1.7:1. However, only 1/5 of this total spending on treatment resulted from PHU treatments, with most of the rest due to fewer but more costly 'other medical' treatments. Hospital and private practice costs thus cause most of the financial burden on households¹. Most mission hospitals in Sierra Leone had exemption systems, which administrators claimed helped reduce deterrence in the face of rapidly rising prices. About 5% of outpatients receive sanctioned exemptions, and perhaps as many inpatients abscond after a hospital stay. Most hospitals in principle required the patient to be interviewed by members of a welfare committee which assessed the patients' ability to pay and made arrangements for the costs to be covered. In addition, some hospitals used the principle of a sliding scale, either by higher formal charges for patients from wealthier districts, or by imploring obviously wealthy patients to pay more than the official charge. Focus group #1 (Q16) and Case Study #3 gave the impression that most people believe that

¹This is of course one of the arguments in favour of user charges for government PHC, namely that the charges would be less than in the private sector, although the comparison is more often between sources of drugs. In this context, drug peddlers are perceived as cheaper, mainly because they are not particular about selling incomplete courses of treatment.

the poor now pay as much as the rich in the mission hospitals, so the hospitals are perhaps in a position to do more to relieve the burden on the poorest households. Government hospitals are also a financial hazard to the poor since informal fees are very high and are negotiated directly with staff¹.

10.3 Horizontal equity

As shown in chapters 6 through 9, there were large differences both between and within geographical areas in terms of specific utilization and burden on household budgets, representing equity differentials more significant than the differences between households of different SES (vertical equity). In addition to the differences between the 2 districts studied, there were significant differences between MAL and LAN chiefdoms even though they are both part of Kenema district, which is generally considered to be relatively wealthy. While there was a statistically significant effect of wealth on PHU utilization in LAN alone among geographical areas, there was also in MAL a very high cumulative burden of treatment expenses on the poor (Table 7.7). Urban areas were significantly better off than rural areas in terms of income and access to health facilities. These patterns imply that chiefdom-level pricing policies would be more effective in maintaining equity than a district-level policies, which in turn would be better than a single national price schedule.

In all rural chiefdoms, households located farther from a PHU were much less likely to use it than those located nearby. Again, the differences in morbidity rates (Table 10.3) were not statistically significant, but suggest an association between proximity to a PHU and lower mortality. Since malaria and respiratory illnesses were the most frequent causes of death, this also suggests that PHU treatments for these conditions were more effective than the alternatives used in more distant villages.

¹Findings of a 1992 African Development Bank study of government hospitals in Sierra Leone.

Table 10.3: Mortality rates by distance from a PHU (per 1000 per year)

	Distance From PHU		
	0 miles	0.5 to 5 miles	>5 miles
Infant deaths	158	199	245
Under-5's	89	110	109
All ages	35.4	45.0	46.8

While MOH policy makers were aware that distant villages are disadvantaged by poor access to PHUs and attempted to construct new PHUs through community self-help programmes, fewer new projects were undertaken as the economic situation worsened. More MCH centres than the more comprehensive types of PHUs have been opened recently, but these offer fewer services and, as seen in BUY chieftdom, were not well utilized. Not only was distance itself a deterrent, but the distant villages were somewhat poorer. To compound the problem, patients from other villages than the one the PHU was in were sometimes charged much more (Case Study #1). Finally, the degree of misinformation about the cost of PHU treatment was greater in the more distant villages.

10.4 Using price discrimination and prepayment to improve equity and affordability

This research has identified problems of affordability and equity of PHC costs and their relative magnitudes, for which a range of possible solutions exist, the feasibility and acceptability of which will be discussed here. An overall objective of improving the welfare of the population is assumed here, as well as a constraint of a limited health budget with which to do it.

If policy makers believe that the existing situation is not acceptable, policy alternatives and possible courses of action are:

- 1) To reduce the burden of treatment costs for all households by:
 - a) encouraging the use of PHUs in place of more expensive forms of medical treatment. The results of this study suggest that this could be done by improving awareness of PHU prices, offering

exemptions, and improving the range of services offered at MCH units.

b) limiting the maximum annual outlay for PHU treatment by means of a prepayment mechanism.

2) To price PHU services selectively to favour the groups which are most deterred from using them and which bear the heaviest financial burden.

a) to compensate for differences in vertical equity.

b) to compensate for differences in horizontal equity.

c) to compensate for lower utilization during the rainy season.

d) to compensate for higher risk of mortality.

10.4.1 Views on exemptions and cross-subsidization

As discussed in Chapter 5, equity is a relative concept, and pricing policy should be guided by local views of what is desirable and acceptable. The concept of cross-subsidization was found to be generally acceptable in Sierra Leone: when asked whether the poor should be asked to pay nothing, a small amount, or the full cost of medicines, 61% answered a small amount, 36% preferred nothing, and 3% said the full amount. Although a higher percentage (45%) in (wealthier) MAL suggested the poor should pay nothing, as did the lowest household and per capita income groups, there were no statistically significant differences between income groups or geographic areas. It was then explained to respondents that the drugs must be purchased by the MOH and paid for from the fees paid, so if the poor pay less, the rich would have to pay more. They were then asked if they still thought it was fair that the poor should have to pay less if the rich have to pay more. Of those who preferred a small payment or free drugs for the poor, only 50% thought it was still fair. The wealthiest respondents were most favourably disposed toward subsidizing the poor if a small amount was paid rather than nothing at all. Another view, that community solidarity would be damaged if people paid different amounts, was expressed in focus group #1 (Q31).

10.4.2 Identifying the poor

Finding objective, practical ways of identifying the poor, if this is regarded as being necessary to implement pricing policies, was one of the major objectives of this research. One approach (an element of the

Bamako Initiative strategy) is to rely on the local knowledge of a chiefdom or village health committee to identify those who are always too poor to pay the full charge, or to decide in individual cases of inability to pay. Chiefdom committees were organized, but at the time of the survey they did not appear to be very active, and could not be expected to be available each time a decision was needed for an exemption. Village health committees, which would be expected to have better knowledge about who needed exemptions from their locality than a chiefdom committee, did not exist in any villages that did not have a PHU. It is possible to contemplate a system similar to that used in some countries, in which a village chief certifies that the patient cannot pay. The chiefs are trusted (Focus Group #1) by their own villagers, but whether they would not manifest a local bias is open to question.

An alternative is a more formal kind of means-testing. Two or three major components of total income (e.g., number of bushels of rice planted, number of petty traders, bags of coffee sold) could serve to identify the rich and the poor, but this approach would need to be verified. Some of the wealth proxies tested that were most closely correlated with income were not applicable to all households in any given year (amounts others owe, amounts spent on ceremonies and emergencies). Others which were less sensitive but more generally applicable could be combined to make a household wealth score, but it was shown in section 7.1.2 that this would misclassify many households. Ownership of assets correlated relatively well with household income (Table A1.14), and was a fairly sensitive indicator of PHU and 'other medical' utilization, as shown in Table 10.4. Assets appear to be a more sensitive indicator of ability to pay than income, since they represent the household's ability to spend income on items other than necessities, which may also be exchangeable for money or food in emergencies. Households with an asset score of 1 or more were much more likely to use PHUs, and those with a score of more than 2 were also more likely to use more expensive treatments. A finer-scaled index could probably be devised, using more common possessions such as cooking pots, shoes, etc., in addition to the assets used in the survey (Appendix 6).

Table 10.4: PHU and 'other medical' utilization vs. asset ownership

Asset index	PHU utilization	'other medical' utilization
0	16.7%	13.3%
1 or 2	22.3%	13.6%
> 2	23.0%	21.3%

However, it is questionable whether the other major criterion for proxies would be met, namely that they should not be easily manipulated by the patient. It is not possible to know to what lengths people would go to distort the truth if this approach to means-testing were taken (for either fee-for-service or a prepayment scheme), so some experimentation and evaluation would be required before adopting it. The proxies which would be less easily manipulated because of their less obvious connection with wealth (e.g., the amount spent on 'sauce' ingredients or house construction details) were found to be weakly correlated with ATP and income. The best of the proxy ATP indicators was the amount of money usually on hand, but the intent of this question would be seen quickly.

If a price-discrimination or exemption decision were needed at the time of every treatment, a more efficient approach than formal means-testing would be to leave the decision in the hands of the PHU staff members who are responsible for managing the drug fund, not to exceed a certain percentage of exemptions, which would be related to the markup. Since it was apparent early in the survey that exemptions were being granted informally at PHUs, a question was introduced into the focus groups about how the poor could be identified, and whether an exemption system not incorporating rigid means-testing was likely to be abused. Denials of knowing others' personal affairs notwithstanding, it was agreed in general that the poor and the rich were readily identifiable. There was also consensus that most people had too much self-respect to pretend they could not afford to pay, although there might be a few such cases. Apart from the high rate of exemptions given to staff members' relatives, this system may work well enough, although an appeal mechanism involving the local health committee would be a desirable adjunct. Further research into informal means-testing could be fruitful. The approach to wealthier patients, (e.g., a fixed surcharge for those recognized by PHU staff as

being rich, or asking for a voluntary contribution), would be simpler than identifying the poor since there is no stigma attached to being rich, and the rich are probably very well known to the rest of the community. In general, considering the relatively low predictive power and ^{the} possibility of manipulating 'objective' proxies, it may well be more efficient to rely on traditional mechanisms for counteracting the small deterrent effects of user charges at the PHC level.

10.4.3 Feasibility and acceptability of prepayment

As mentioned in Chapter 2, prepayment or insurance schemes have received relatively little attention in sub-Saharan Africa despite their inherent advantages of risk-sharing and loss limitation. All such schemes involve the collection of a premium or subscription, issuing proof of entitlement (a 'health card' has sometimes been used), purchasing of drugs and/or other goods and services, and good management, and two of the most frequently mentioned drawbacks are the lack of ability to pay a fairly high annual premium and the need for an administrative mechanism which is trusted by the community. Focus group discussions indicated that the principle was thought to be a good one, and that money would be most available in December and January. This is the time of most ceremonial feasting, so the purchase of the health card or equivalent would likely come at the expense of feasting, which would have minimum adverse effect from the point of view of welfare. The drawbacks, as revealed in focus group #1 (Q38, Q39, Q40) were that not everyone would be able to make a one-time payment of the amount suggested (Le 400 for a year's coverage), and uncertainty about who could be trusted with the drugs and money. In fact, the total premium required to cover the actual (as opposed to the official) markup would be far in excess of this if there were no subsidies. (If the premium were established based on official drug prices and markups, it is possible that there would be resistance from PHU staff who would no longer be able to hide their unofficial markup in a total fee for service.) These problems would require time and experience to resolve.

10.5 Discussion of policy options

10.5.1 Option 1a: increasing PHU utilization without price discrimination

Reducing PHU prices relative to other treatments would directly relieve only a small fraction of the burden of the cost of illness, but if PHU visits were substituted for 'other medical' visits, even if present prices were maintained, total expenditure on treatment would decrease. For example, if 50% of all cases now using more expensive providers were treated initially at PHUs, the cost of the new mix of treatments would drop from 6.9% to 5.6% of household income. This would also raise the percentage^{of} PHU treatment expenditures from about 20% to nearly 40% of total health expenditures, so any pricing policy changes (i.e., to favour the poor) and efforts to enforce official prices would then have twice the effect on total health expenditures. For a substitution rate of 75%, the percentage of income would drop to 5.0%, and PHU expenditures would be 49% of all treatment costs. A higher volume of PHU visits would in turn achieve the recovery of fixed and semi-fixed costs (e.g., transport of drug kits, stationery) at a lower unit cost, and thus allow future increases in the official markup to be kept to a minimum.

Improving awareness of prices: Making the official prices more widely known would achieve higher utilization in several ways. As discussed earlier, this would probably cause fewer people who thought they did not have enough money to be deterred. It would also make it easier to control abuses of the system by PHU staff. Simplification of the pricing schedule would undoubtedly also assist in this regard. The system of individual drug prices results in an official price list (Appendix 7) that is formidably long and hard to understand by the public. The major theoretical objection to price bands or single pricing is that more expensive drugs will be demanded. Analysis of the price list and the most often treated complaints suggest that tablets and capsules could be conveniently put into 2 or 3 price bands, ointments and tinctures into another, and injections into 2 or 3 categories. Alternatively or in addition, prices of standard adult and child treatments for the most common illnesses could be calculated and publicized. The first 10 most common reasons for presentation at PHUs account for 85% of cases, so including different child and adult prescriptions for some illnesses, most cases

would be covered by a dozen or so prices. Cross-subsidization of more expensive treatments for life-threatening illnesses (e.g., antibiotic injections for respiratory infections) by less expensive and essential treatments would also be easily incorporated into a simplified price schedule.

Per-episode pricing: While only 11% of illness episodes involved a second action taken in the recall period, the second action was often more costly. Pricing treatment by the episode rather than by the visit would result in lower expenditures by households which had more serious illness, and would also encourage follow-up treatment at PHUs, which could in turn lower total costs by reducing unnecessary self-referrals to more expensive providers. This would of course raise the average cost of treatment for cases not requiring subsequent treatments, but not by more than 10-15%. The concept should be acceptable, since it is the same as used by most traditional practitioners.

Offering alternatives to full cash payment (without means-testing): Since all income groups exhibited relatively high rates of financial deterrence (only the highest income quintile was significantly lower than the rest), and since apparently much of this deterrence was due to the temporary unavailability of money in the household, an exemption scheme which compensated for this could increase utilization if its existence were widely known. Full exemptions for the 35% of all cases that were financially deterred would mean that fewer than half of PHU users would pay, requiring another doubling of the markup on drugs, but other approaches can be imagined. An extension of the present informal credit system, in which the user promises to repay the fees within a certain time, and obviously wealthy users are asked to pay extra, would be workable. Accepting payment in rice could also encourage people who have trouble selling rice before leaving home, and would also work well in a formal credit system. These approaches would require creative accounting systems and the active participation of local health committees.

Minimum range of PHC curative services: The desirability of substituting PHC for higher levels of treatment raises a question of the range and quality of services which should be provided by PHUs. While this problem

was beyond the aim of this research, the field data indicated that nearly all common problems were treated at PHUs (Table 6.9) but also that the range of services offered by MCH units did not attract as many users as the more comprehensive Community Health Posts and Centres.

10.5.2 Option 1b: Prepayment to limit the burden on household budgets

While the cumulative cost burden on the poor could be reduced by means of a sliding scale that lowered the cost of visits for the poor, probably a more effective way of accomplishing the objective would be to limit the maximum amount paid in PHUs, ideally to a percentage of income (however measured). This could be done efficiently through a prepayment scheme. If it is found necessary to introduce means-testing, it is more efficient to do so at the subscription time than to have to verify facts or identity at each PHU visit, although some type of identification could be used to certify exemption status. A copayment would probably be necessary to minimize excessive use, especially by nearby residents, and to enable the revolving fund to adjust prices on an ad hoc basis to keep up with drug cost increases. The copayment amount could also be geared to income (by having different colour cards, for example), since a lower marginal payment would differentially encourage the use of the PHU by the poor, and would be paid without much complaint by the rich if it were lower than the full cost of drugs from the market. A major potential drawback to this scheme is the difficulty people would have paying what is basically a year's average cost of treatment at one time, perhaps even with cross-subsidization. Government subsidies would be necessary, but are unlikely.

10.5.3 Option 2a: Price discrimination by SES group

Although the principle of cross-subsidization was generally acceptable and objective methods of identifying the poor (and rich) could probably be developed, it is difficult to envision the advantage of any such scheme when most of the poorer 60%, if not 80%, of households are in a similar financial situation. Probably the best way to do this would be if the exemption-cum-deferral system described above were operated in a way that allowed full exemptions only for those who absolutely could not pay (requiring the active participation of a PHU community management committee), with subsidies provided by the wealthy in the form of higher payments.

10.5.4 Option 2b: Price discrimination by location of residence

The differences between districts and chiefdoms are too large to ignore, and there would be few obstacles to establishing official price structures that are proportional to local (i.e., chiefdom) income levels. This would tend to equalize utilization, but would also mean that areas with higher prices and incomes would also have more funds available from the official markups for PHC development. Cross-subsidization between communities could be considered as going against the principle of local control of revenues, and could be politically difficult to accomplish. The same could be accomplished through direct subsidies from the government, but the distinction between public and private subsidies is quite small when maximum cost recovery is a necessary objective.

Encouraging more PHU visits by people living distant from the facility would probably accomplish more in the way of improving equity of utilization than any attempts to improve vertical equity, and could also be much easier to achieve. It would be worthwhile and a relatively simple matter to offer a lower price schedule to the more distant villages, and to see if this increased utilization. Objections to cross-subsidization might be raised, but the fairness principle is obvious and objections could be discussed. While it is possible, it seems unlikely that people would be able to falsify their village; this would have to be tested. As a starting point, a reduction in PHU fees proportional to distance walked could be tried.

10.5.5 Option 2c: Price discrimination in favour of those in greatest risk

Although identification of other high-risk categories was not a main objective of this research, some of the results suggest that a policy of lenient exemption for certain categories of cases could be effective in achieving PHC mortality reduction objectives. While the numbers found in the household survey were small, it is likely that there is excess infant and child mortality from malaria and respiratory illnesses among the poor and in villages distant from a PHU. If it were known that treatment for children was free or very cheap, this might encourage earlier presentation for treatment.

10.5.6 Option 2d: Seasonal price adjustments

Despite the contradictory observations on the availability of money by users of PHUs and the lower rate of financial deterrence reported, the drop in utilization observed in the rainy season was probably due to less money being available. It is also probable that the 'hungry' season observed was a particularly easy one. There may not be a need to reduce prices in the rainy season, but there is potentially a need to allow for more exemptions in bad seasons. The timing of price increases is best left for the period when most people reported maximum availability of money, i.e., after the rice harvest in November/December, and all price rises should be very gradual.

Chapter 11:

Conclusions and the Broader Relevance of the Research

11.0 Introduction

Perhaps the most general conclusion of this research is that the economic behaviour of households when confronted by illness is complex and difficult to generalize. This fact alone explains the inconclusive nature of the previous work reviewed in Chapters 2 and 3. The methods and results which have been described here do not in themselves represent a 'magic bullet', i.e., a simple set of observations and formulae which when processed would reveal an affordable price and exemption schedule, for those charged with making efficient and equitable cost-recovery policies. Yet, much of what was learned appears to have potential application in settings other than Sierra Leone, and lines of future research can be identified which could answer questions which were not definitively resolved.

11.1 How generalizable are the findings?

The surprising finding (in view of the assumed poverty of rural subsistence farmers) of high vertical equity of use of priced services must be seen in the context of Sierra Leone's history of payment for medical care in all sectors. Since this history may be unique, there is no justification for claiming that equity should be as high in other countries with similar rural economies when PHC services are priced similarly, but hopefully it will encourage comparative research, particularly in West Africa. As far as the somewhat tentative affordability findings are concerned, namely that 0.12% of annual income (or two daily agricultural wages) appears to be the threshold of significant deterrence for the poor, this should be adopted generally only with great caution. Here too, a repeat of this research would be needed to confirm this result.

11.2 Applicability of the research methods used

The health interview survey methodology provided useful and generally

reliable data, and has become a widely-used research tool in many countries. How it would need to be adapted to other contexts depends largely on the objectives of the new study: in this research, the sample size and the approach of matching household economic characteristics with the outcome of treatment decisions was adequate to detect relatively small differentials in vertical equity. The horizontal equity differences could have been found with a somewhat smaller sample, and if the major aim of a study is only to determine how household budgets are allocated, a much smaller sample size would have sufficed also. On the other hand, a much larger sample would be needed if the main objective was to measure differential mortality rates.

The household survey was highly experimental in the sense that little was known beforehand about measuring differences in SES in the specific environment, so if the findings for Sierra Leone are thought not to apply in another country, analysis and data collection would be much simplified if some preliminary fieldwork were done. Some of the 'rapid appraisal' methods such as 'wealth ranking' (Grandin 1988) could be used, together with in-depth household interviews to establish SES factors before the main survey.

The qualitative survey instruments were valuable for clarifying how cash enters what was apparently a mainly subsistence economy, and also in uncovering community attitudes about paying for treatment which could not be fully expressed through a questionnaire survey. The number of focus groups conducted was probably excessive, as little new was learned after the first 2 despite differences between the communities. Case studies were useful, and would probably be an efficient way to learn more about decision-making in the face of illness.

As is probably true of most quantitative research, the effort required to analyze the data was vastly more than initially expected. This is a general argument for researchers not to succumb to the temptation of expanding their research instruments the maximum that the field resources will permit. Given a complex dataset, however, techniques such as multiple regression proved to be an efficient way to examine them. If one has confidence in the survey data and knows exactly what one is looking for or

has a clear model, it should be possible to bypass the examination of individual variables (presented in Chapters 6 and 7) and proceed directly to modelling. This could be done (cautiously) for a quick assessment of horizontal and vertical equity in different regions, for example.

11.3 A different approach: operational research

The research described here had broad initial goals, but a broad and fruitful research agenda could also be developed by working backwards from specific operational questions. Several likely avenues of continuation of this research are:

- 1) To identify communities or sections of communities which experience high mortality and morbidity, and to examine in depth the relationship between health status and low income, poor access to facilities, malnutrition, sanitation, or other risk factors. This type of direct observation, focussing on groups for which interventions could have a large impact on programme objectives, is likely to be more informative than general population surveys.
- 2) As expected, the data provided by the cross-sectional survey did not reliably reveal much about the price elasticity of demand for treatment. While not strictly essential for setting prices, it would be ideal to have an idea of the effect of price changes. A carefully planned and controlled longitudinal experiment appears to be the only way to gain this information.
- 3) It would be useful to verify some of the speculative conclusions of this research by an observational study at household level of the treatment choice decision-making process. Because of the risks involved in treating malaria and respiratory illnesses with market drugs, it would be valuable to observe the decision process in detail at the household level, especially the extent to which the choice rests on availability of money and the outcome of the episode. Since drug vendors are the major source of modern medicines in villages distant from a PHU (and where government health services are unlikely to be introduced for many years), this

could be linked with research into changing the vendors' behaviour to improve the effectiveness of their treatments and minimize the potential for inducing drug resistance.

4) The effect of dissemination about the actual costs of PHU treatment on the utilization could be studied in a simple comparison of a few chiefdoms.

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Appendix 1:

Additional Tables and Figures Referred to in the Text

Table A1.1: Estimated infant and child mortality rates by district

Calculated Rate per 1000 live births	Port Loko Rural	Kenema Rural
Infant Mortality	153 (PMISU 173)	240 (PMISU 216)
Under-5 Mortality	(PMISU 310)	(PMISU 318)

Table A1.2: Causes of death by chiefdom

Count Col Pct	Port Loko Dist BNK :BUY		Kenema Dist LAN :MAL		URBAN	Row Total
MALARIA AND FEVERS	15 15.5	15 14.6	19 16.0	24 28.6	5 21.7	78 18.3
DIARRHOEAL DISEASES	5 5.2	5 4.9	7 5.9	6 7.1		23 5.4
INFECTIOUS INCL. TETANUS	6 6.2	8 7.8	13 10.9	5 6.0	2 8.7	34 8.0
RESPIRATORY INFECTIONS	17 17.5	16 15.5	8 6.7	5 6.0	4 17.4	50 11.7
CARDIOVASCULAR	1 1.0	3 2.9	2 1.7	1 1.2	1 4.3	8 1.9
ANAEMIAS	1 1.0	2 1.9		1 1.2		4 .9
MALNUTRITION			1 .8	1 1.2		2 .5
HEMNIAS	2 2.1	1 1.0	2 1.7			5 1.2
STOMACH (UNSPECIFIED)	4 4.1	3 2.9	9 7.6	4 4.8	1 4.3	21 4.9
UGTI/STD	1 1.0	1 1.0	2 1.7	2 2.4		6 1.4
COMPLICATIONS OF CHILDBIRTH	2 2.1	2 1.9	3 2.5	1 1.2	1 4.3	9 2.1
OLD AGE, SENILITY	11 11.3	8 7.8	6 5.0	6 7.1	1 4.3	32 7.5
TRAUMA, POISON, ACCIDENT	1 1.0	2 1.9	1 .8	2 2.4	1 4.3	7 1.6
CONVULSIONS, EPILEPSY	3 3.1		3 2.5	5 6.0	1 4.3	12 2.8
OEDEMA	5 5.2	15 14.6	7 5.9	5 6.0	1 4.3	33 7.7
HEADACHES	4 4.1	2 1.9	13 10.9	4 4.8	2 8.7	25 5.9
PAINS (ALL SITES)	10 10.3	10 9.7	6 5.0	2 2.4	2 8.7	30 7.0
MISCELLANEOUS	3 3.1	4 3.9	4 3.4	1 1.2	1 4.3	13 3.1
NOT SPECIFIED, UNKNOWN	6 6.2	6 5.8	13 10.9	9 10.7		34 8.0
Column Total	97 22.8	103 24.2	119 27.9	84 19.7	23 5.4	426 100.0

Table A1.3: Percentage of cases using treatment options as a second action, by geographic area

	PORT LOKO DIST		KENEMA DIST		URBAN	Row Percent
	BNK	BUY	LAN	NAL		
Second Action Taken						
GOVERNMENT DIST HOSPITAL	1.4	1.6	3.1	8.0		3.8
GOVERNMENT PHC UNIT	22.9	1.6	16.9	19.5	10.0	15.7
MISSION HOSPITAL	1.4	14.8	3.1	11.5	10.0	7.8
DRUGS FROM PEDDLER	21.4	24.6	10.8	23.0	10.0	19.8
TRADITIONAL HEALER	10.0	4.9	18.5	6.9	20.0	10.2
GOVERNMENT STAFF PRIVATELY	2.9	11.5	24.6	11.5		11.9
HERBAL SELF-TREATMENT	34.3	36.1	21.5	16.1	40.0	26.6
PRIVATE HOSPITAL/PRACTITIONER		1.6		1.1	10.0	1.0
HAD DRUGS AT HOME	5.7	3.3	1.5	2.3		3.1
Geographic Area Cases	70	61	65	87	10	293
Percent	23.9	20.8	22.2	29.7	3.4	100.0%

Table A1.4: First action taken for cases in which a death occurred, by geographic area

Col Pct	BNK	BUY	LAN	NAL	URB	Row Total (cases)
GOVT DISTRICT HOSP	11.3	7.8	9.2	10.7	30.4	10.8 46
GOVT PHC UNIT	42.3	7.8	31.1	42.9	8.7	29.1 124
MISSION HOSPITAL	3.1	37.9	.8	11.9	17.4	13.4 57
DRUGS FROM PEDDLER	2.1	6.8	3.4	8.3		4.7 20
TRADITIONAL HEALER	6.2	5.8	9.2	7.1	4.3	7.0 30
GOVT STAFF PRIVATE	4.1	6.8	10.1	7.1	4.3	7.0 30
HERBAL SELF-TREAT	3.1	5.8	10.1	1.2	8.7	5.6 24
PRIVATE PRACTICE	5.2		.8	2.4	4.3	2.1 9
NO TREATMENT	14.4	15.5	10.9	2.4	13.0	11.3 48
DIED SUDDENLY	8.2	5.8	11.8	6.0	8.7	8.2 35
DON'T REMEMBER			2.5			.7 3
Column Total	97 22.8	103 24.2	119 27.9	84 19.7	23 5.4	100.0 426

Table A1.5: Reason for not using medical treatment in illness cases, for the second action taken

REASON	Pct	Total
THOUGHT NOT SERIOUS		1.3
GOT BETTER SOON		0.7
TOO FAR TO TRAVEL		8.5
NOT ENOUGH MONEY FOR TREAT		50.3
THOUGHT DRUGS UNAVAILABLE		3.9
NOT EFFECTIVE FOR PROBLEM		21.6
KNEW SELF-TREATMENT		7.2
OTHER		4.6
DON'T KNOW		2.0
	Column Total	153 100.0

Table A1.6: Amounts spent on second actions by action and by chiefdom

	Amount Paid for Action - Leones	
	MEAN TOTAL PAID	Percent paying zero
For all Chiefdoms		
GOV'T DISTRICT HOSP	1274.0	0%
GOV'T PHU	106.1	18%
MISSION HOSPITAL	1067.9	0%
DRUGS FROM MARKET	56.6	2%
TRADITIONAL HEALER	170.9	7%
GOV'T STAFF PRIVATELY	185.5	3%
HERBAL SELF-TREATMENT	12.8	70%
PRIVATE DOCTOR/HOSP	206.7	0%
HAD DRUGS AT HOME	0	100%
NO TREATMENT	0	100%
For all Treatments		
BMK chiefdom	94.2	36%
BUY chiefdom	230.4	35%
LAN chiefdom	111.8	22%
MAL chiefdom	328.8	20%
URBAN areas	78.0	30%

Table A1.8b: Illness cases by age group and by chiefdom

Count Col Pct (per 1000)	Port Loko Dist BMK	BUY	Kenema Dist LAN	MAL	URB	Row Total
UNDER FIVE	108 20.7 (304)	79 11.9 (195)	140 22.1 (425)	141 25.9 (402)	44 24.7 (287)	512 20.1
5-9 YEARS	59 11.3 (167)	72 10.8 (166)	68 10.7 (214)	68 12.5 (205)	33 18.5 (172)	300 11.8
10-15 YEARS	52 10.0 (204)	56 8.4 (168)	26 4.1 (149)	31 5.7 (176)	24 13.5 (216)	189 7.4
OVER 15	303 58.0 (237)	458 68.9 (299)	399 63.0 (315)	305 56.0 (220)	77 43.3 (166)	1542 60.6
Column Total	522 20.5 (233)	665 26.2 (245)	633 24.9 (315)	545 21.4 (220)	178 7.0 (166)	2543 100.0

Table A1.9: Selected results of the National Household Income and Expenditure Survey (NHIES) (Figures in leones, with last column in \$US at Le 130= \$US 1)

	Household Income	Household Expenditure	Per Capita Income	Per Capita Expenditure Le	\$US
Port Loko Rural	180375	180375	23425	23425	\$180
Kenema Rural	130500	114500	24952	21892	\$168
Urban PL+KEN/2	219565	170300	41929	33349	\$257
Freetown	256780	197300	49285	37870	\$291

Table A1.10: Household income and per capita income quintiles by geographic area

Area	20% below:		40% below:		60% below:		80% below:	
	HH	PC	HH	PC	HH	PC	HH	PC
All	17500	2070	30000	3651	43460	5750	62500	9388
BMK chiefdom	20000	2143	30000	3667	43750	5357	60000	8750
BUY chiefdom	17216	1875	30348	3138	43400	4746	67500	8750
LAN chiefdom	13750	1500	20760	2642	30000	4708	45000	7000
MAL chiefdom	20000	2500	35000	4515	49500	7308	75000	12500
Urban areas	30000	3938	42660	6135	56200	8571	82000	11667

Table A1.11: Survey sample household composition

	BNK		BUY		LAN		MAL		URBAN	
	TOTAL	MEAN /HH	TOTAL	MEAN /HH	TOTAL	MEAN /HH	TOTAL	MEAN /HH	TOTAL	MEAN /HH
Under one year	80	0.32	102	0.38	77	0.29	87	0.32	39	0.36
1 to 4 years	275	1.10	303	1.14	252	0.98	264	0.97	97	0.88
5 to 9 years	353	1.41	433	1.63	318	1.23	331	1.21	192	1.76
10 to 14 years	255	1.02	334	1.26	175	0.68	176	0.64	111	1.02
15+ (adult)	1280	5.12	1537	5.78	1268	4.91	1387	5.08	464	4.26
Household total	2243	8.97	2709	10.18	2090	8.10	2245	8.22	903	8.28
Attending school	285	1.14	326	1.23	172	0.67	215	0.79	262	2.40
% 5-15 in school	46.8%		42.5%		34.8%		42.4%		86.4%	

Table A1.12: Mean amounts paid for first actions, by income group

a) Including cases paying zero:

By levels of Per Capita Income

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			107.6509	363.4352	2352
RPC INC	1.00		106.0804	378.7669	597
RPC INC	2.00		113.2157	366.3346	510
RPC INC	3.00		92.8216	228.4704	482
RPC INC	4.00		82.9801	276.3578	403
RPC INC	5.00		149.8444	527.5156	360

By levels of Total Household Income

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			107.6509	363.4352	2352
RTOT INC	1.00		100.7388	361.5716	467
RTOT INC	2.00		118.4022	465.9275	460
RTOT INC	3.00		91.2961	266.2304	466
RTOT INC	4.00		84.3877	207.6529	472
RTOT INC	5.00		142.3203	443.6516	487

b) excluding cases paying zero:

By levels of Per capita income

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			163.6684	437.8213	1547
RPC INC	1.00		165.3525	462.6100	383
RPC INC	2.00		178.7616	447.6429	323
RPC INC	3.00		133.9521	264.3333	334
RPC INC	4.00		137.0533	344.8262	244
RPC INC	5.00		205.1103	608.2093	263

By levels of Total Household Income

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			163.6684	437.8213	1547
RTOT INC	1.00		159.4746	444.7686	295
RTOT INC	2.00		180.9468	566.3835	301
RTOT INC	3.00		142.7651	321.8678	298
RTOT INC	4.00		126.0475	243.3238	316
RTOT INC	5.00		205.6677	521.1799	337

c) All cases, by Treatment Type and Household Income Group

Variable	Value	Label	Mean	Std Dev	Cases
		GOVT PHU	131.6056	207.5452	464
RTOT INC	1.00		138.0500	205.4205	80
RTOT INC	2.00		169.7412	297.8713	85
RTOT INC	3.00		123.5500	175.9035	100
RTOT INC	4.00		114.9785	168.2833	93
RTOT INC	5.00		118.3491	177.5664	106
		OTHER MEDICAL	424.6118	832.2132	340
RTOT INC	1.00		429.3710	879.9124	62
RTOT INC	2.00		430.2208	1031.9000	77
RTOT INC	3.00		372.0847	622.7849	59
RTOT INC	4.00		313.2063	445.4707	63
RTOT INC	5.00		543.4810	945.7383	79
		SELF-TREAT DRUGS	47.9107	107.1425	750
RTOT INC	1.00		46.2129	83.4368	155
RTOT INC	2.00		36.7739	48.7203	115
RTOT INC	3.00		39.0000	74.8488	154
RTOT INC	4.00		50.4258	64.3696	155
RTOT INC	5.00		62.6842	183.0296	171
		SELF-TREAT HERBS	8.1935	39.2660	496
RTOT INC	1.00		5.8113	26.3088	106
RTOT INC	2.00		12.1443	58.5648	97
RTOT INC	3.00		12.0707	49.5931	99
RTOT INC	4.00		6.0000	29.7222	119
RTOT INC	5.00		4.8133	12.1674	75
		TRAD HEALER	71.8981	138.4019	108
RTOT INC	1.00		84.2632	171.5122	19
RTOT INC	2.00		38.5385	69.6902	39
RTOT INC	3.00		60.8824	105.7012	17
RTOT INC	4.00		54.7500	104.3600	16
RTOT INC	5.00		161.7647	224.0322	17

d) For PHU treatment, including paying zero:

Variable	Value	Label	Mean	Std Dev	Cases
For Entire Population			131.6056	207.5452	464
RPC_INC	1.00		123.4032	184.4928	124
RPC_INC	2.00		197.4639	304.4515	97
RPC_INC	3.00		112.7347	168.1414	98
RPC_INC	4.00		108.1951	171.6383	82
RPC_INC	5.00		106.1746	137.9915	63

Table A1.13: Independent variables used in regressions with ATP index

Variable	Mean	Std Dev	Minimum	Maximum	N	Label
HH TOTAL	9.35	4.72	1.0	31.0	647	N household members
CONSUMED	6.86	3.48	.95	22.93	647	N 'consumption equivalents' in household
HH SCHL	1.17	1.58	.0	9.0	647	N children in school
HH US	1.49	1.36	.0	9.0	647	N under 5 yrs
CHRONIC	.13	.37	.0	2.0	646	N chronically ill in household
CONSTRUC	13.43	4.29	4	27	647	index based on house size and construction
ENUM SES	1.97	.64	1.0	4.0	647	enumerator's ranking of household SES
N CONTRB	2.32	1.43	1.0	9.0	647	N economically active household members
NFARMER	1.46	1.33	.0	7.0	647	N household members farmers
NMINER	.11	.42	.0	4.0	647	N household members miners
NPTRAD	.40	.82	.0	7.0	647	N household members petty traders
NLTRAD	.04	.21	.0	2.0	647	N household members large traders
NJRCS	.09	.33	.0	3.0	647	N household members junior gov't employees
NCRAFT	.10	.29	.0	2.0	647	N household members senior gov't employees
NREMIT	.13	.52	.0	6.0	647	N who remit money to household
LE OCCS	26736.48	37212.62	0	250000	647	Estimated household non-farming income
LNOCSS	8.14	2.89	4.61	12.43	647	Log non-farming income
LE FARM	20107.22	24388.72	.0	264100	627	Estimated household farming income
LN FARM	8.73	2.26	4.61	12.48	627	Log farming income
TOT INC	46977.24	43376.19	.0	307500	627	Estimated total household income
LN TOT INC	10.39	1.01	4.61	12.64	627	Log total income
PC INC	6232.59	6911.10	.00	65000	626	Estimated per capita income
LN PC INC	8.29	1.08	2.30	11.08	626	Log per capita income
RICE BU	2.93	3.85	.0	60.0	525	Bushels of rice planted
AMT SOLD	845.44	2015.93	0	12000	68	Money received from garden crops
OIL LE	634.11	2357.77	0	14000	258	Value of palm oil produced
LN OIL	2.90	1.85	2.30	9.55	258	Log value of palm oil produced
BUY RICE	3.95	3.06	.0	12.0	593	N months rice bought by farm households
OWN TOT	1.69	2.71	.0	22.0	647	Index of consumer possessions
SP RICE	76.13	51.59	6	400	297	Amount spent on rice yesterday
SP RICE1	13.32	8.73	2.37	105.26	297	Ant spent rice per 'consumption equivalent'
SP DTHE	77.91	57.34	2	500	616	Amount spent on sauce ingredients
SP DTHE1	13.64	11.37	.24	86.96	616	Ant spent sauce per 'consumption equivalent'
N EATEN	1.62	.55	.0	4.0	638	N meals eaten yesterday
SP TOTA	4481.45	7099.96	20	40000	168	Amount spent on ceremonies last yr
LN FEAST	7.33	1.59	3.00	10.60	168	Log amount spent on ceremonies
EM COST	2225.26	3183.15	7	30000	289	Amount spent on emergencies last year
LN EMG	6.84	1.49	1.95	10.31	289	Log amount spent on emergencies
OWE LE	872.54	1969.45	0	14000	167	Amount cash owed to others
OWE KIND	1715.91	4845.02	0	40000	171	Amount kind owed to others
OWE LE	470.30	1416.04	0	10000	165	Amount cash others owe household head
OWE KIND	1504.29	4161.39	0	32500	170	Amount kind others owe household head
OWE	2587.63	5516.10	.00	40000	167	Total cash and kind owed to others
OWED	1807.74	3909.04	.00	34900	164	Total cash and kind others owe
LN OWE	5.63	2.71	2.30	10.60	167	Log total owed to others
LN OWE	4.93	2.77	2.30	10.46	164	Log total others owe
POCK MAX	3200.22	9284.06	0	99000	135	Amount in pocket dry season
POCK MIN	214.99	557.85	0	5000	131	Amount in pocket rainy season
SCHL INDX	.93	.85	.00	2.00	555	School attendance index
LN SCHL	-1.60	2.46	-4.61	.70	555	Log school attendance index
AGGCASES	1.97	1.28	1	9	647	N illness cases in household
N FOWL	.64	.48	.00	1.00	647	Dummy for owning fowl
N LIVE	.32	.47	.00	1.00	647	Dummy for owning large livestock
COFCOC	4286.65	9139.30	.00	106600.0	323	Income from coffee and cocoa
LN COFCOC	5.20	3.23	2.30	11.58	323	Log income from coffee and cocoa

Table A1.14: Correlations between wealth, income and ATP index variables, for all categories of obtaining money together

Correlations:	HEALTH					INCOME			HH_TOTAL	ATP INDICES	
	CONSTRUC	ENUN_SES	OWN_TOT	SP_OTH	POCK_MAX	LNFARM	LNOCCS	TOT_INC		LNWG	LNTOTAL
CONSTRUC	1.0000	.3795**	.3423**	.3461**	.1260	-.0944*	.1660**	.2456**	.3102**	.1744**	.1773**
ENUN_SES	.3795**	1.0000	.3116**	.2868**	.1781	-.1036*	.2134**	.2408**	.0990*	.1651**	.1526**
OWN_TOT	.3423**	.3116**	1.0000	.4727**	.4165**	-.1476**	.2906**	.4007**	.1640**	.2426**	.2288**
SP_OTH	.3461**	.2868**	.4727**	1.0000	.5664**	-.1718**	.2270**	.3075**	.1938**	.1653**	.1685**
POCK_MAX	.1260	.1781	.4165**	.5664**	1.0000	-.2285*	.1402	.0895	.0518	.2506*	.2108*
LNFARM	-.0944*	-.1036*	-.1476**	-.1718**	-.2285*	1.0000	-.3810**	.0739	.2162**	-.1313**	-.0933*
LNOCCS	.1660**	.2134**	.2906**	.2270**	.1402	-.3810**	1.0000	.5584**	-.0919*	.1625**	.1338**
TOT_INC	.2456**	.2408**	.4007**	.3075**	.0895	.0739	.5584**	1.0000	.1150*	.1401**	.1305**
HH_TOTAL	.3102**	.0990*	.1640**	.1938**	.0518	.2162**	-.0919*	.1150*	1.0000	.0798	.1311**
LNWG	.1744**	.1651**	.2426**	.1653**	.2506*	-.1313**	.1625**	.1401**	.0798	1.0000	.9805**
LNTOTAL	.1773**	.1526**	.2288**	.1685**	.2108*	-.0933*	.1338**	.1305**	.1311**	.9805**	1.0000

Minimum pairwise N of cases: 125 1-tailed Signif: * - .01 ** - .001

Table A1.15: Sample output of SPSS logistic regression procedure

logistic regression USALLMED with TOT_INC WALK_P1 DIST_HI NEAR_PHU
 ILLALMED LNSCHL SEVERE LKNOWNED AGEGP1
 /categorical=agegp1/step/contrast (agegp1)=dev/criteria pin(.1)/classplot/print=summary corr.

Total number of cases: 2543 (Unweighted)
 Number of selected cases: 2543
 Number of unselected cases: 0
 Number of selected cases: 2543
 Number rejected because of missing data: 564
 Number of cases included in the analysis: 1979

Dependent Variable.. USALLMED use any medical
 Beginning Block Number 0. Initial Log Likelihood Function
 -2 Log Likelihood 2541.3617
 * Constant is included in the model.

Beginning Block Number 1. Method: Forward Stepwise (WALD)

Step	Improv.			Model			Correct	
	Chi-Sq.	df	sig	Chi-Sq.	df	sig	Class %	Variable
1	56.089	1	.000	56.089	1	.000	66.14	IN: ILLALMED
2	33.692	2	.000	89.780	3	.000	66.09	IN: AGEGP1
3	21.203	1	.000	110.984	4	.000	66.04	IN: LKNOWNED
4	17.549	1	.000	128.533	5	.000	67.21	IN: WALK_P1
5	26.370	1	.000	154.903	6	.000	68.47	IN: NEAR_PHU
6	13.942	1	.000	168.845	7	.000	68.57	IN: DIST_HI
7	15.425	1	.000	184.270	8	.000	68.42	IN: SEVERE
8	3.383	1	.066	187.653	9	.000	68.37	IN: LNSCHL

End Block Number 1 PIN = .1000 Limits reached.

Table A1.15 (continued)

Final Equation for Block 1
Estimation terminated at iteration number 3 because
Log Likelihood decreased by less than .01 percent.

	Chi-Square	df	Significance
-2 Log Likelihood	2353.709	1969	.0000
Model Chi-Square	187.653	9	.0000
Improvement	3.383	1	.0659
Goodness of Fit	1980.124	1969	.0000

Classification Table for USALLMED

		Predicted		Percent Correct
		.00	1.00	
Observed	0	1179	124	90.48%
	1	502	174	25.74%
Overall				68.37%

Variables in the Equation

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
WALK_P1	-.1584	.0498	10.1202	1	.0015	-.0565	.8535
DIST_H1	-.0279	.0069	16.5586	1	.0000	-.0757	.9725
NEAR_PHU	.9102	.1415	41.3710	1	.0000	.1245	2.4849
ILLALMED	.0377	.0067	31.8267	1	.0000	.1083	1.0384
LNSCHL	.0872	.0474	3.3829	1	.0659	.0233	1.0911
SEVERE	.3997	.1032	15.0000	1	.0001	.0715	1.4913
LNDOWNED	.2057	.0741	7.6960	1	.0055	.0473	1.2283
AGEGP1			29.7428	2	.0000	.1006	
AGEGP1(1)	.4243	.0847	25.0745	1	.0000	.0953	1.5286
AGEGP1(2)	-.4358	.0878	24.6636	1	.0000	-.0944	.6467
Constant	-2.2947	.2944	60.7589	1	.0000		

Correlation Matrix:

	Constant	WALK_P1	DIST_H1	NEAR_PHU	ILLALMED	LNSCHL	SEVERE	LNDOWNED	AGEGP1(1)	AGEGP1(2)
Constant	1.00000	.02059	-.24695	-.12234	-.83592	.17390	-.19440	-.20140	.19890	.03282
WALK_P1	.02059	1.00000	-.35349	-.00377	-.03181	.09440	-.01429	.07821	-.04632	.04633
DIST_H1	-.24695	-.35349	1.00000	-.44665	.04692	-.01536	-.09914	.01940	-.01896	-.00409
NEAR_PHU	-.12234	-.00377	-.44665	1.00000	-.05323	.06404	.07451	-.12029	-.04575	.00588
ILLALMED	-.83592	-.03181	.04692	-.05323	1.00000	-.00643	-.00030	.01305	-.17429	.00092
LNSCHL	.17390	.09440	-.01536	.06404	-.00643	1.00000	-.00894	-.22078	-.03064	-.04835
SEVERE	-.19440	-.01429	-.09914	.07451	-.00030	-.00894	1.00000	-.01691	-.04060	.04580
LNDOWNED	-.20140	.07821	.01940	-.12029	.01305	-.22078	-.01691	1.00000	.03446	-.06168
AGEGP1(1)	.19890	-.04632	-.01896	-.04575	-.17429	-.03064	-.04060	.03446	1.00000	-.67239
AGEGP1(2)	.03282	.04633	-.00409	.00588	.00092	-.04835	.04580	-.06168	-.67239	1.00000

Variables not in the Equation

Residual Chi Square	.100	with	1 df	Sig = .7514
Variable	Score	df	Sig	R
TOT_INC	.1003	1	.7514	.0000

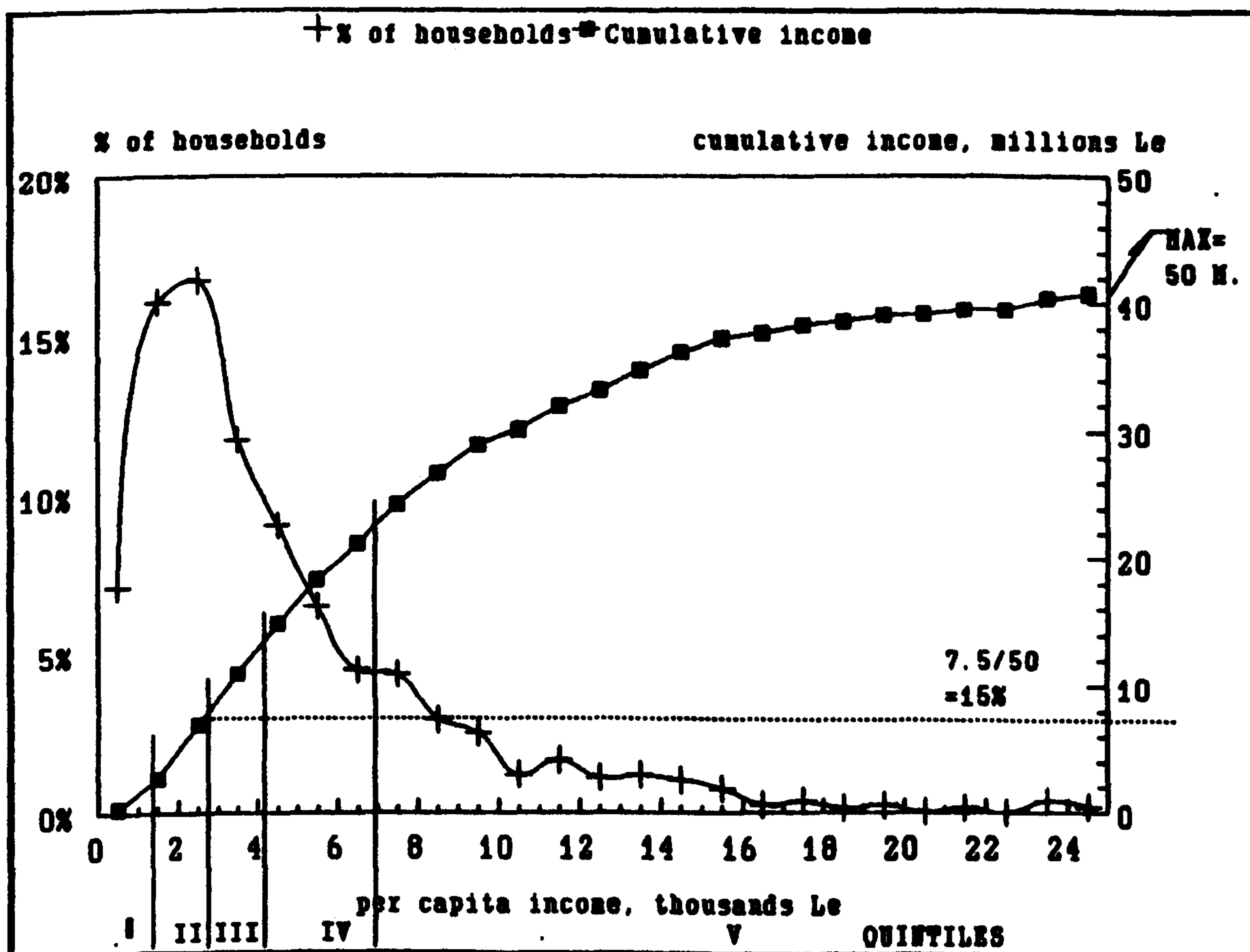


Figure A1.1: Per capita income distribution and cumulative income, Port Loko and Kenema rural chiefdoms

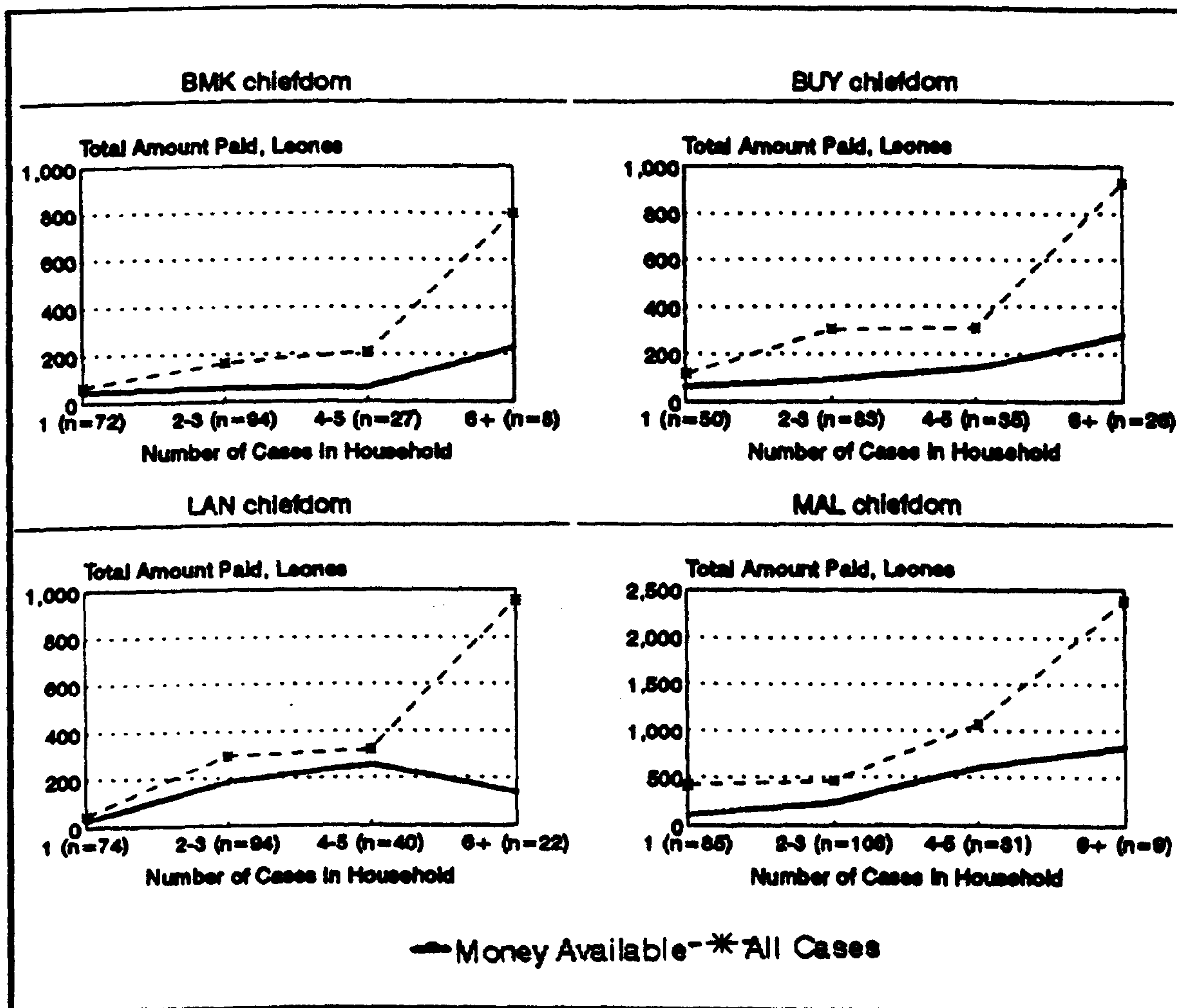


Figure A1.2: Effect of multiple illnesses in the recall period on availability of money

Appendix 2:
Case Studies

Case Studies from village interviews

Kenema District

1. Njala: House #9

Njala is a very small village accessible only by footpath after crossing a river. Livelihoods are small coffee and cacao plantations, with free-lance diamond mining nearby.

The house has 2 rooms with mud-and-wattle walls and a thatch roof. 3 adults and 2 children comprise the household. The woman's husband is a diamond miner, and there are no other contributors. (But this is an example of how a household member may grow a salable crop even though s/he is not referred to as an economic contributor. The village heads call her to cut rice, for which she is given rice in exchange.)

She did not buy rice but cooked 3 cups of the rice she earned, for herself and the child. She spent Le 40 on palm oil (a pint will last 3 days), and Le 30 on other ingredients for sauce.

Illness cases: Adult F with serious headache and fever, and a 2-year old F with fever and scabies. The woman and child were both ill at the time of the visit. There was no money in the house, but 2 days after the onset of illness her husband returned from Lawoma with Le 200. She said she doesn't know how he got the money (probably from mining).

She walked to Weiima (about 3 hrs away) but the dispenser asked her for Le 500 so gave her only part treatment - 1 injection for the child and 2 injections plus 6 tablets for herself. She had no more money but returned to the PHU because she was still feeling sick, and was "driven away". She then decided to send someone to buy chloroquine because she was "cold" and knew that chloroquine was good for this. She didn't have the Le 20 needed, but got it by selling potato leaf and pepper. She took 4 chloroquine tablets and now feels better. She also gave the child chloroquine, and the child also is feeling better.

Q: Why not just buy chloroquine in the first place?

A: When a person is sick they should go to the hospital.

This woman also had chronic dysentery and worms since her last pregnancy. (While pregnant she had an acute attack of vomiting. She was admitted to hospital and treated, but only partially because of the pregnancy.) Within the past 2 weeks she has another attack, but did not go to the PHU because she had no money, and so used wild leaves. The attack stopped for 2 or 3 days, then returned. Now she says she hasn't enough money to be treated for worms.

Asked about how she would cope with an emergency expense of Le 500, she said she would go to a person who trusts her, or to her parents. "It's common, if someone doesn't have enough, you go to someone who does." On equity questions, "If someone has nothing, they should get medicine from God. If others have to pay more, it's okay."

**** Contrast the statements of the dispenser from the PHU at Weiima: Since the inception of cost-recovery, everyone in the chiefdoms nearby knows they must pay. He will accept half payment with the balance on completion of treatment. There were some problems in charging because he had no UNICEF drug kits from August to December and had to buy drugs on the market.

He claims that patients from outside the town of Wilima pay 1/4 the price of residents, which is completely at odds with other tales which state the opposite. He admits there was a "crisis" in the village when other villages in the chiefdom refused to pay for PHU construction. Wilima residents then did not want other villages to use the PHU. Allegedly the dispenser is under great pressure to charge outsiders more and to give Weiima people free treatment. He claims that everyone pays the same amount

for items from the drug kits. For non-kit items he charges only the cost price of the item, and not including his transport costs.

Other complaints about the dispenser: He charges Le 120 for BCG for newborns. Kpetema patients have paid Le 600-1000 for treatment. Dispenser: "This is a mining area - people tell lies." (In fact he probably takes advantage of the relative wealth.)

2. Giehun Kojo, house 3. This is a better-off looking household, with concrete floors, concrete pillars supporting a zinc roof, and walls of plastered mud. The head of the household is a farmer, and the brother is a trader. Sacks of cacao can be seen in a storeroom. The trader says that the farmer makes more money than he does - he doesn't know how many bags he buys and sells, but he makes a profit of Le 600 - 800 per bag. The trader brother sees his household as being better off than most other households in the village.

3. Giehun Kojo, house 26. This is an average-looking house, opposite from a church near the village centre. However the interviewer could not tell the status. The interview was conducted in Krio using an interpreter for Mende. The man interviewed is a farmer, and sold 5 bags of cacao for Le 5000 and exchanged one bushel of coffee for rice. Between this and his own crop, he has to buy rice for 3 months out of the year. He has to buy rice Nobody else in the household contributes. He also has a food garden. He wears a good suit, and is holding about Le 100 in one hand.

They have no listed possessions, although the senior wife was wearing good clothes. They cooked 8 cups of rice yesterday at Le 20 each, and spent Le 80 on soup. They spent money together with other households on ceremonies - they spent Le 300 on his father's funeral, and also sent several basins of cooked rice which he borrowed from relatives who had already sold their crops. A village dispute cost his sister Le 120, which they raised by selling bananas. In an emergency costing Le 500 he would pledge crops.

He had trouble understanding the question on equity, but finally said the poor should pay like everyone else. "The whites (at Segbwema) are no longer allowing exemptions". [Possibly this was said for the benefit of the white man present, according to the interviewer]

During the past 2 weeks one child had a fever, and couldn't play for several days. She was taken by foot to Segbwema [mission hospital] for treatment. The child has recovered. They were charged Le 200 but had only Le 80 with them.

A second child also had fever and they walked to Segbwema again. The charge was Le 200 but this time they had the full amount.

Sam Grovesnor, field supervisor: Farmers place high traditional value on feasting after the harvest. They do not consider it important to save for emergencies. These are met by borrowing and repaying after the next harvest, including a small coffee harvest in August during the rains.

Farm production is limited by inputs, mainly labour. This has been made even more serious by increased migration from farm areas. Farmers only cultivate an area that their families can manage. Land is freely available, and seed is saved from previous harvests.

School fees are about Le 1000/year for primary. Le 2000-3000 for secondary.

Given the risk of losing their crops to moneylenders if an emergency should strike when they have no cash, why do the villagers spend so apparently recklessly on feasting during harvest season? Answer - traditional values are stronger than "rational" financial planning.

4. Sendumei, house 11. A visiting son gives his sick mother money to go to the PHU. She has anaemia and swollen feet. His son has kwashiorkor,

looks weak. He had gone to Kenema hospital where he paid Le 600 for medicines and Le 200 for consultation.

Another brother is sick, spent Le 500 for a traditional healer. He had the money from his trading occupation (buys coffee/cacao here, sells in Kenema). He has a big extended family, and could get Le 500 from them if he needed to. This man believes the government should charge the poor only a nominal amount, and it is right for the better-off to pay more than the cost of the medicines. Seasonality: He can have as much as Le 10000 after the harvest, and saves it to last to the rainy season, when he will have about 5000 left. By the end of the rains it is used up.

There was a death of a newborn due to complications of delivery. He paid Le 1500 for admission to private hospital in Kenema. The baby died 2 hours after birth.

The Community Health Officer is new at post, and has tried hard to revive confidence in the PHU. He describes Sendumei as a poor town, mostly rice farming and little coffee/cacao. Farms are small and there is little cash cropping, according to a teacher who had to resign as head to become a class teacher in order to have more time for farming. His stipend is Le 1500 per month, but he received it last 5 months ago. He says it is impossible to charge people here Le 200 to treat common conditions. He charges people who say they are poor nothing or a reduced amount, and there are a few instances where a higher amount (Le 200) has been charged for malaria or headache. People in Gbandawo said they have preferred to travel to the PHU at Blama than to Sendumei, even though it is more than twice the distance, because it is a larger town.

5. Sendumei HH 35: 16 household members, 11 of whom are children.

Patient #1: 6 yr old male had pneumonia, went to PHU. Charged Le 120 for treatment, got slightly better. He had only about Le 60, so was treated half on trust by the CHO.

P #2: 9 year old male, had a sore. Medicine was bought in Kenema from a pharmacy, where they had gone for other purpose. (Mother??) had to sell a tin of palm oil which she had produced to pay. Now feeling better.

P #3 :14 year old male with malaria. Went to the PHU, paid Le 120, but got worse. He was advised by elders to seek advice from a herbalist, who treated him for Le 600. He is now recovering. Patient had to pay Le 200 in advance, a fowl, 14 cups rice, and a bottle of palm oil just to get the herbalist off to the bush to gather the herbs. Then he had to pay Le 200 more, borrowing the money and the fowl from friends. Different people loaned different things.

(Note on Sendumei: Farms are small, with small cash crop sales. Most cash borrowed is returned in kind. 2 cases of kwashiorkor seen.

6. Gorahun Vaama HH 24 Head of household (around 50, born here), is town chief.

P #1: had fever, wanted to buy tablets but no vendors were around (reason entered on Q was 'too far to travel'). Used lemon grass tea, got slightly better. Next day vendor came so he spent his last money (Le 20) on 4 tablets, and got better.

P# 2: headache, went to herbalist because no transport was available. Paid Le 10.

P #3: Fever and scabies, used leaves he picked himself.

P #4: Female child with fever. Household heads bought tablets for Le 42, now child looks better. Money given to him by brother-in-law, must be repaid tonight. Will repay by selling bananas from his plantation, which he normally uses for family's own consumption. One tree is enough to pay debt, and he owns 20 trees.

P #5: had a chronic stomach ache and had been using herbs but didn't get better so went to a private dispenser 10 miles away at Poturu, getting a (free) lift on a motorbike. He asked for Le 400, but she gave him 280, which was all she had when she left home. Now feels slightly better. She had the money, which her husband had left with her.

P #6: Septic sore on leg. Bought 10 tetracycline capsules in a span of 2 weeks, at Le 4 each. She was lent the money by a friend without interest. He can repay it any time he gets the money (He is a rice farmer, but hasn't harvested his rice yet. He can get (only) Le 6/cup at this time.

The household head's wife gave birth to a baby who died last March at age 3 months from tetanus. The TBA gave a injection, for which she was paid Le 40. They had the money at the time.

Another dependent lost a 1 month old baby to tetanus. Treated it with native medicine, but the baby died. The mother was not well enough to travel, so they sent for the dispenser and the TBA but they did not come.

A field survey supervisor rated this family 'average' SES. The household head is a rice farmer and has cash crop plantations. He used to be a tailor but now depends on farming. Five household members help with farming. A brother who is a policeman in Kono sometimes sends money. Every adult had his own farm, ranging from 1/2 to 1 bushel planted, and they make separate cash sales. One bushel planted yields 3 to 10 bushels. They sell a bushel which contains 60 butter cups at Le 6 per cup, or Le 360 per bushel. 3 bushels of rice are planted in total, every year. They have 5 acres of coffee trees, with about 4-500 trees per acre. In a good year these yield 1-1/2 to 3 bags of clean coffee, but the trees did not bear much last year so their yield was only 1 tin, or Le 600. They own chickens, but no livestock. They consume all their own harvest, and then have to buy rice for 6 months. They do not plant more rice because they would not have enough labour to work the coffee and banana plantations. The family owns 4 wristwatches and a sewing machine.

Everyone ate rice yesterday, from their own harvest. Plassas was from their garden, but they bought a pint of palm oil (Le 30), Maggi (Le 6), dried fish (Le 10) and salt (Le 8). This total of Le 54 was supplied by the household head, and Le 4 for chili peppers was from the wife's own pocket. The wife cooked in the morning and in the evening, so the family ate 2 times.

Emergencies: Mother-in-law died last week, requiring Le 3000 in expenses. They raised the money by cleaning their first harvest (3 months worth of consumption) and selling it. He is depending on a good coffee harvest this year to buy the extra rice. If there were another emergency costing Le 500 he would borrow it from a friend.

The head would like to see free treatment for the poor, but if it requires others to pay more, only those who can afford to should have to pay more.

7. Mutual aid in Woroma (Langrama chiefdom): Women's committee has a cassava and rice farm, and the men have a mutual rice farm. They sell the produce and keep the money for emergencies. Planted 6 bushels of rice this year. Last year they harvested 85 bushels from 1-1/2 bushels planted. This year they expect 150 bushels yield from the 6 bushels. (?)

Price of coffee Le 20/lb last year. Higher this year, but buying hadn't started yet. Bag weighs 175 lbs. Cacao sold for Le 20/lb this year.

8. Yibeima HH #8: The household head was educated and spoke English, described himself as an agriculturist. His 2 wives both had severe headaches which lasted about 3 weeks. He sent the first wife to the PHU at Yabaima (35 minute walk), where the dispenser gave her tablets and an injection for Le 90, which she had on hand.

The next wife, Bindu, was also sick. She sold 8 cups of rice to buy Panadol from a passing vendor for Le 48. She did not go to the PHU because she couldn't sell enough rice, but had enough for tablets. The same was true when his 3-year old son Sheku had a headache. Then they sold 3 cups of rice and bought Panadol.

This man plants 5 bushels of rice and harvests 40-50, which feeds the family of 9 for 10 months. He has to buy rice for 2 months, "especially if they get guests in the 2 months before the harvest. He gets cash by selling coffee (Le 3000 this year) and his wives are small traders.

9. Yibeima HH #9 The household head is a poor-looking elderly farmer. One of his 6-year old sons had a fever, for which native leaves were applied but the boy did not improve. He had no money for medicine so went to a nephew who loaned him some cacao which he had just harvested, to sell so he could buy medicines. He used the money (Le 40) to buy "Chinese oil", which made the boy better. To repay the nephew's loan he will sell rice, of which he planted 1 bushel in the swamp. The 1 bushel planted feeds 6 people for 2 months. He must buy rice for the remaining 10 months. He also has small holdings of coffee and cacao. (Last year he sold only Le 400 worth of cacao, and his coffee trees did not bear at all). He owns 1 sheep and 4 fowl, and claims no possessions.

The household bought no rice yesterday, but had to sell Le 40 worth of rice to buy plassas for sauce. The household had no ceremonies in the past year, but lost a village case that cost Le 40,000 (although the agriculturist doubted the size of this case). He has "many ways" of getting money, including business transactions involving palm oil (possibly buying and holding until prices rise). He also has two brothers, one a chief, one a carpenter, who send money occasionally. If he needed Le 500 for an emergency, he would borrow it.

10. Gorahunwa HH #1 Head, a farmer, spent Le 6000 on an initiation, but he had been saving for "1 to 3 years in advance". He raised the money by borrowing, producing palm oil, and selling coffee. He would raise Le 500 in a current emergency by pledging his coffee crop. If sick during the rainy season, he would have no source of money, and would "leave everything to God."

11. Gorahunwa HH #3 The chief plants 6 bushels to feed 9 people in the household, but he has to buy rice for 7 months because he entertains guests frequently, and sells rice because of bad storage conditions and then buys it back later.

Port Loko District: Flat, getting very dusty in January. Palm trees and oranges. Friendly kids and grownups, but hospitality isn't as overwhelming as in Kenema. Team members are getting sick and all are tired today. We are almost out of paracetamol, and have already distributed about 10 doses of chloroquine. Nobody is going hungry here but they are certainly just getting by. All the houses are crumbling. Many goats and chickens scraping around, and smoke from cooking fires make the landscape look like northern India. Each house has a rice storage chest on the verandah.

12. Konta Ferry HH #8 A death was reported, and not enough money to pay for treatment. Victim was an adult male, age unknown but he has children. The household head is the elder brother of the deceased and the town chief. He said the man had pain but refused to go to the hospital. He was sick for 4 or 5 days. It was originally reported that the reason was not enough money, but the brother denied that. He was not very healthy, couldn't control urination. Was his death due to witchcraft? "Couldn't tell."

2. Use of Injections: Barmoi PHU: A high number of injections, mostly crystalline penicillin, was recorded in the register. The dispenser says he is now using the Essential Drugs manual, and has cut down on injections for malaria.

13. Gbaran HH #1 Illness of infant was paid for, but recorded as not having enough money on hand. Source was reported as "begged/got gift", but the woman had gotten the money from her husband. "Gifts" may be therefore from other household members, and probably should be counted as having sufficient money since it represents a certain amount of "goodwill" possessed by the household which would also be reciprocal if the donor were to approach the recipient when the recipient had enough money.

14. Magbando HH #5 (Multiple providers) Patient is a woman of about 35 with a viral (herpes) skin condition and a nervous problem for the past 2 months. She first tried native herbs but didn't get better. Ten days after the start of the problems she got an injection from a peddler whom she did not know, and got slightly better, but she is now still ill. She also bought tablets from a vendor for Le 16. To pay for the injection she borrowed Le 180 from her brother, but couldn't repay it, so the brother wrote off the debt.

15. (Death) The adult brother of the head had a stomach ache, went to Freetown first and then the Mabessene, but died after returning home. The family did not remember how much was spent, but the man had enough money.

The household head and 4 other members assist in farming. They plant 2 bushels of rice and have oranges, plantains and bananas as cash crops. They have to buy rice for 3 months, for a household of 10 people. They do not sell any rice after harvest.

16. Magbando HH #9 The wife of the household head just delivered and is having abdominal pains. She used native herbs, but has no money for the PHU.

Her husband borrowed Le 80 from his brother, and will have to repay it with rice worth Le 800! He says he doesn't mind, and will manage with less rice because he has a banana plantation, a cassava plantation, and will make some palm oil. Asked if they will have enough to eat this year, he answers "no, but they will manage somehow." The household of 9 people plants 4 bushels, and buys rice for 3 months.

17. Kamasundu HH #25 (Pledging and repayment) The household head would get Le 500 by pledging a cash crop, but if he couldn't redeem it in a reasonable time he would sell rice to repay the loan. His reason is that the person who lends money can harvest the cash crop indefinitely until the pledge is redeemed.

18. Masonkie HH#10 (Town Chief, 21 people in household) A case of multiple sources of money.

Head of household is a farmer, plants 3 bushels of rice. No other crops except bananas which he sells occasionally. He can only sell them if he carries them to Ferudugu. He never sells his own rice harvest, but must buy rice 8 months of the year, for which he gets money from "people who give him small amounts."

P #1: The chief (age about 40), has had sores and insensitive skin on his foot for 2 years. Occasionally he cannot work because it 'itches.' He bought drugs from a vendor for Le 50, and had money available. He got slightly better. He didn't go to Mabessene mission hospital because he thought it would have cost Le 100 including transport. He was able to spend Le 50 because it was spread over a 2-week period. He has been to the mission hospital 7 times in the past 2 years for the same problem. He also used herbs as a second action.

P #2: His wife, around 40, fell while pregnant. She now has neck pain and trouble breathing and cannot work. She paid a peddler Le 100 for an injection, which her husband gave her, but condition remained the same. She did not go to hospital because there was not enough money, but she did not know how much it would have cost.

P #3: An adult male, around 40. Suffers slow urination, probably UTI, and cannot work. He used herbs because he was told by others that it

"is not a hospital problem." He did not know how much it would have cost to go to the hospital because he had never been to one.

P #4: Adult female, pregnant, with a cough she first described as not serious, later changed to serious, although she looks healthy now. She used tablets bought by her husband from a peddler, but didn't know if he had the money available. She said that she would actually have gone to the hospital if she had the money.

P #5: 5-yr old female with chest pain, not serious. Used herbs first, then drugs were purchased from a peddler. Money was available.

P #6: Adult male (Bai) with stomach ache. He used herbs and also capsules which he had bought more than two weeks ago. He would have gone to hospital if he had the Le 600 he thought it would have cost.

19. Masonkie HH#9

This household planted 9 bushels of rice and harvested 30 bushels. The household of 21 consumed all their rice by the end of the next harvest. They also consumed all their cassava. They get gifts from relatives, especially the families of married daughters. The household head had a poor yield 3 years ago and had to borrow small amounts from various people over a 2-year period. Now heavily indebted, when asked how he will repay the 50 bushels of rice he owes, he replies that he will do it bit by bit as he gets money or rice throughout the year rather than all at once. He will also ask daughters' inlaws for some. "Are they rich?" "Not really rich, but they must help out if I am in trouble." He had a bundu (initiation) ceremony this year on which he spent Le 20,000. Good friends of his contributed. Other males who want to have initiated females as wives also contributed (he has 9 daughters.) Note: Ability to borrow depends on credibility but everyone seems to have someone who trusts him. People will maintain credibility by "digging and covering" until they have to flee the region.

20. Masamboi HH#16: Use of Market Medicines

P #1: Household head, had a painful boil but still could work. He bought "Chinese medicine" from a trader for Le 24. He would have gone to the hospital but thought it would have cost Le 100. He was feeling slightly better at the time of the interview.

P #2: 6-year old boy with fever, described as not serious. Mother bought Top-Tabs for Le 20, and the boy got better. Also rubbed Chinese medicine. He didn't go to hospital because it was too far (asked if he would have gone if it had been only 2 miles - yes).

P #3: 4 year old male with constipation, which resulted in a stomach ache. They would have taken the child to hospital if he had become helpless, but used native leaves instead. The cost to them was zero. Asked why they used native leaves rather than medicine from a peddler, they replied that the peddler wasn't available - he comes only every 2 weeks. He also knew the leaves are effective.

21. Worre Bana HH#19

This is a fairly well-off looking household in a well-off village (on main road), but the wife had no money when her child was ill, so spent Le 8 on tablets. She thought it would have cost Le 300 to go to Mabesseneh. There is little doubt that this could have been raised if the husband had been home and it had been a serious case. (See also HH#30 Port Loko: boy Foday had no money because the father was not home, even though it was a well-off house.

Appendix 3:

Household Survey Quality Control Methodology

Assessing Response Reliability in Health Interview Surveys by Reinterviews

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24 August 1992

Data from interview surveys at households or health facilities are used to assess such community parameters as health status and factors related to ability and willingness to pay for health services. While the effect of sample size on confidence intervals is generally well understood by survey designers and the policy makers who use the survey results, the typical survey is also subject to non-sampling errors of magnitudes which may eclipse the sampling errors. These are only rarely assessed and reported with the survey results even though they may have a major effect on their interpretation. This study measured non-sampling errors in a household survey conducted in Sierra Leone by comparing the results of reinterviews with the responses given originally, and found that certain types of questions are subject to greater error than others. The findings should be of use to designers of similar surveys, and to those who rely on such surveys for making policy decisions.

Health interview surveys

Household surveys have become a valuable tool of health planners and policy makers in the search for better ways of managing and financing the activities of the health sector. Especially in less developed countries, where official health statistics may be facility-based and data from censuses or general population surveys are likely to be incomplete or out of date, the information required to make sound policy decisions may be best obtained through specialized surveys. If a comparison of users and non-users of health facilities is needed, it is usually necessary to sample the general population by means of household interviews.

Sources of error and need for quality control

Sample surveys are subject to two basic types of errors: *sampling errors*, which are attributable to the problem of obtaining information about an entire population from a selected sample, and *non-sampling errors*, which are due to variations between a given response and the true answer. Sampling errors can be estimated a priori and can be made as small as necessary by increasing the size of the sample and by designing the survey to ensure that the sample represents the population with a minimum of bias. Non-sampling errors can be defined as all errors other than sampling errors, and result from biases introduced at any stage of the survey process - survey design, questionnaire development, field data collection, data processing analysis, or reporting - which affect the validity or reliability of the results. The causes of some non-sampling errors, such as mistakes in recording responses or in data processing, can be minimized by exercising care and using

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appropriate quality control procedures, while others, such as the respondent's inaccurate recall or wish to conceal the truth, may be extremely difficult to avoid.

The magnitude of both kinds of error is of great importance when reporting the results of the survey. The level of significance of an observed difference between groups, for example, is related to the errors associated with both sets of measurements. It is normal practice to use computers for analysing data sets from surveys, and to report results which the software package finds statistically significant. The total error of a sample variable is the geometric sum of the sampling error and the non-sampling errors, but it is unlikely that the non-sampling errors would have been taken into account by the statistical software. Researchers and readers alike may be misled by widely used guidelines for survey design which appear to promise, for example, a 95% confidence interval of plus or minus 10% if a certain calculated sample size is used. Such "rules" ignore the effect of non-sampling errors. Using the field of health economics as an example, some of the seminal reports on the subject of user fees and the price elasticity of demand for treatment were based on household survey data of unspecified validity. The reporting of results based on sophisticated econometric methods may have masked deficiencies in data quality.

The importance of non-sampling error is highlighted in classic texts on survey methods, such as (1). The authors bemoaned the lack of attention paid to non-sampling errors by researchers using household surveys and suggested that '...there is here a fertile field of research for students of survey methodology. It is of the greatest importance for all engaged in surveys.'

A standard text on surveys in developing countries (2) suggests that, '...as a minimum, a rough grading of quality be provided the reader, for example:

- A) Basic data are reliable (accurate objective methods used): error is mainly due to sampling.
- B) Parts of these estimates rely on memory recall of the respondent: non-sampling error may be as important as sampling error.
- C) Respondents were reluctant to answer the question on which this item depends: non-sampling error is substantially greater than the sampling error.'

The authors cited an example of a published agricultural survey in which some of the non-sampling errors were estimated to be six times greater than the sampling errors. The practical implication is that costly efforts to reduce sampling errors by increasing the sample size may reduce the total error only slightly when non-sampling errors are large, and indeed can increase it if having a larger sample requires a relaxation of other standards of quality.

Although non-sampling errors are routinely reported for large, national censuses, smaller scale surveys often ignore such errors. A review of health interview studies in developing countries (3) cited only a few where any type of validity check was made, yet important variations in reporting were

measured in both of the morbidity surveys where reinterviews were used. Recall bias in case-control studies has been reported in only one study of reproductive hazards (4), and for that one most citations quoted it incorrectly. So, as Moser and Kalton suggested in 1971, this is still a fertile area of research, particularly in the health field.

In contrast to the cut-and-dried calculation of sampling errors, the estimation of non-sampling errors is possible only empirically. Several methods have been used to check the validity and repeatability of health interview surveys. These include internal consistency checks, comparison with "expected" patterns, reinterviews, medical examinations, cross-checks against medical records, repetition of the study using a different sample, and observational studies. Moser and Kalton suggested that post-enumeration surveys (PES) consisting of reinterviews should become standard practice. The PES of the UK 1981 national census demonstrated that true non-sampling error rates are hard to predict and are frequently under-estimated in the absence of a PES (5)(6). One problem with large-scale PESs is the inevitable delay between the original survey and the repeat survey. This leads to a confounding of true error with recall error arising from informants' inability to remember the situation at the time of the original survey. On the other hand, reinterviews have been criticized as a validation technique (7) on the grounds that the result of the second interview will be unpredictably influenced by the first, with the degree of influence likely to increase with shorter intervals between the interviews.

Despite these limitations, reinterviews are a practical and useful method of assessing non-sampling error in household surveys. In a recent example from the health research literature (8) 'consistency checks' were performed on a questionnaire used in a clinic setting and repeated in households about a week later. In this case-control study of the health impact of improved water supply and hygienic practices, the authors examined responses to level of maternal education and use of water source. There was disagreement between data collected at the clinics and that collected at home for both these variables. For maternal education a difference of 0.4 years in the mean duration of maternal schooling between the clinic interview and home interview was observed, which led to a statistically significant difference when comparing cases with controls. A high rate of misclassification (23%) was also found for the variable 'type of water source used by the household' but the authors suggest that the differences obtained were most likely due to a real change in water sources between the two interviews. This highlights the importance of minimizing the time period between interview and re-interview.

In considering variables used to examine the association between other sexually transmitted diseases and HIV infection (9) the effect of misclassification of the variable 'number of sexual partners in the last year' was estimated. If for example 50% of the subjects having five or more partners in the last year claimed that they had fewer than five, and 5% of

those having less than five partners claimed they had five or more, they showed that because sexual activity was measured imprecisely there was an apparent association between syphilis and HIV infection where, in fact there was none.

Designers of surveys which attempt to obtain new types of information, especially from unfamiliar cultural zones, would benefit from knowing in advance the reliability of certain types of questions and the magnitude of the non-sampling errors which should be expected. This report examines these needs in the context of a health utilization and expenditure survey which was undertaken recently in sub-Saharan Africa.

Materials and methods

The Ministry of Health of Sierra Leone has been introducing user fees for primary health care since 1982 under several pilot projects, and in 1989 undertook operational research to obtain information on the effects of payment on equity and utilisation of services. This study included a survey of 1156 households in two rural districts, with a questionnaire composed of modules on household demographics, illnesses within a two-week recall period and actions taken in response to them, household socio-economic indicators, and questions on equity and the seasonality of household finances.

Refinements in questionnaire design and survey technique were made in order to minimize potential sources of error. No hypothetical questions were asked, such as where a person would go for care if they were sick, or how much they would be willing to spend. A list of lay terms for common symptoms was read to assist respondents in recall of illness events in the two-week recall period (10). Questions were pretested and modified to minimize confusion, and experienced interviewers were used who had received specific training on the questionnaires and spoke the local languages. Even so, it was considered possible that answers given by respondents (mainly illiterate subsistence farmers having relatively little contact with health services or "modern" concepts of health and illness) might not be completely reliable. Responses such as illness of household members, treatments used, and amounts spent depended on the recall of past events. Others, such as household membership, might be subjective, while still others, such as the quantity of crops sown or harvested, and the possession of livestock, might elicit deliberate false answers.

Quality control was addressed by checking questionnaires for completeness and internal consistency while interviewers were still in the village, and rectifying discrepancies by sending the original interviewer back to the household. After corrections were made reinterviews were conducted with 15% of originally surveyed households. Original questionnaires were selected at random and kept aside while different interviewers returned to the selected houses. The time lapse between original interview and reinterview varied from less than one hour to overnight. Respondents were not told if

their answer differed from the one given in the original interview and no explanation was sought by the interviewer.

For attributes relevant to the study, the characteristics of reinterviewed households were similar to those of the originally interviewed population. In about one-quarter of the revisited households the original respondent (usually the head of the household) was unavailable so a different household member was reinterviewed. Analysis of differences between the original and reinterviews in these cases also provides information about the reliability of using respondents other than household heads and mothers.

Reporting non-sampling errors

The problem of how response reliability can be estimated from reinterview results has received relatively little attention. For the sake of discussion, a reliable response will be taken as one which is repeated when the respondent is asked the question on the reinterview. A reliable response may not necessarily be a valid one, since validity implies that the question was interpreted by the respondent to mean what the interviewer intended and was answered truthfully, but if a response is repeatable, a major type of non-sampling error can be assumed absent. In some studies which have included large-scale PES's, non-sampling error has been reported in a way which provides detailed information on errors associated with each response category for a question, defined as follows:

Gross error rate is the proportion of responses in a given category for which a different response than the original one was given in the reinterview. It is therefore a measure of the reliability of individual responses to a given question, and also of the level of randomly occurring error which would be undetected by a gross comparison of original and reinterview data. Errors which occur randomly tend to weaken or mask the true relationships by introducing anomalies into observed results.

Net bias is the difference between the proportion of answers to a given question falling into a given category in the original interview and in the reinterview. This estimate of error is generally smaller than that indicated by the gross error rate because erroneous responses will cancel out to some extent by randomly falling into different categories. Net bias reveals systematic errors which tend to distort true relationships. This rate can therefore be considered to be a measure of reliability of the question for the entire sample, i.e., the degree to which a response could be expected to vary between interviews. The sum of the net biases for all response categories for a given question equals zero.

Relative net bias is derived from net bias; it is the net bias for a given category expressed as a percentage of the proportion of responses found in the reinterview falling into that category. The usefulness of relative net bias is doubtful, as it is always biased upwards for categories with fewer

responses. Table 1 shows examples of these three measures from the 1981 PES undertaken for the UK census.

Where appropriate, this schema has been used here to compare the reliability of interview questions and response categories from the Sierra Leone survey. While the error parameters just described can measure the reliability of discrete response categories within questions, they are inappropriate for continuous variables such as age and expenditures. Additional parameters have been used in the analysis of errors in continuous variables for this survey: the percentage of individual responses which do not match exactly, the mean difference between pairs of values and the absolute of the mean, the mean of the ratio of error to original value, and the mean of the absolute value of this ratio. These provide information about the magnitude of the error in addition to the frequency of error.

Reliability of Survey Variables:

As an example, the reliability of the variable 'age of ill household member' was analyzed by a comparison with the reinterview data. Results of the analysis both by age category and as a continuous variable are shown in Tables 2 and 3, which reveal some of the weaknesses of the conventional reporting method when continuous variables are involved. Gross error and net bias as calculated by age ranges (Table 2) are less stringent than the criteria of exact match and mean absolute error as percentage of age by single year interval (Table 3).

A summary of similar analyses on other variables used in the survey is given in Table 4. In general, the means, medians, and distribution of reinterview responses closely matched the original responses. While it is comforting to know that the results are consistent for the population sample as a whole, the fact remains that individual case error is high for some important questions, such as the reason for self-treatment. If this indeed reflects non-sampling error, it should be taken into account in reporting results.

Table 4 also compares the repeatability of responses on reinterviews with the original respondents with the reinterview results obtained from respondents who were not the original respondents. While reinterviewing a different respondent may not be methodologically sound, the fact that different respondents were able to supply the same answers as the original respondents to certain questions shows that certain, but not all, types of information are well known to many household members.

Discussion

These results suggest that a typical small-scale household health interview survey can be subject to varying degrees of non-sampling error. The meaning of repeatability as an appropriate measure of validity is open to

question, however. If a respondent gives the same answer to a question asked by a different interviewer some time after the first interview, it is likely that the respondent was sure of the answer in the first place and had it well fixed in mind. Given the opportunity to change the answer, the respondent chose not to. While this is a reliable answer, it implies little about validity. Consistency of response does not rule out the possibility that the original response was biased or a deliberate fabrication. When the interval is short, as in the present survey, a deliberate lie in the first interview would tend to be repeated in the second.

Using similar reasoning, a different answer to the same question could mean the respondent originally had no firm answer in mind but made a best guess. The response in the reinterview might be nearer to the absolute truth if the respondent deliberately reconsidered the question, or it might be another vague guess or attempt to satisfy what may seem to be the interviewer's desire for an answer of any sort. Since respondents were always given the chance to say they did not know an answer, in principle the only reason for a deliberate lie would have been when it would benefit the respondent; such topics in the questionnaire usually can be identified.

For questions for which there is no evident motive for a lie, a repeated initial response might indicate a valid response, while a different response in the reinterview can mean that a degree of uncertainty existed in the mind of the respondent and the response was probably not valid. Leaving aside the possibility of interviewer recording errors, in this case the original answer (normally the only one available for analysis) was probably wrong and it cannot be certain that the second answer is any more accurate. This is suggested by the lower overall rate of consistent responses when a different respondent is reinterviewed about an event within the household. Two types of error may exist in this case: the two respondents may have different opinions or interpretations of the question, or one may simply be worse informed about the situation.

These problems may be insoluble if there is no collateral information about the validity of both the consistent and the inconsistent responses. When analysing the quality of the US Current Population Survey by the use of re-interviews (11) the surprising result was found that proxy data produces lower response variance than self-reported data. This was partly explained by the fact that response variability is an inadequate measure of data quality, and that reliability is a necessary, but not a sufficient, condition for accurate data. The proxy reports may have been consistent without being valid.

Relevance to health interview surveys

From Table 4, some generalizations can be made about the relative reliability of different types of questions often asked on health information surveys:

1. Questions for which high response reliability (case error less than 10%) was observed included the sex of household members, actions taken in response to illness, whether an injection was received during treatment, identification of household members who were ill in the recall period, and source of money used to pay for treatment. When zero or medium to high amounts were reported paid for treatment, the error associated with the price paid was also in this lowest range.

2. Somewhat higher case error (10-20%) was found for the variables incidence of illness, whether enough money was on hand to pay for treatment, age of ill household members, the amount the respondent thought medical treatment would have cost in cases where self-treatment was used, and for medium amounts paid for treatment.

3. Highest case error (20-30%) exists for questions related to the result of action taken, the seriousness of illness, the reason for choosing non-medical treatment, and for high levels of expenditures on treatment.

4. It is evident that questions of a subjective nature, such as the seriousness of an illness or the outcome of treatment, are subject to considerable uncertainty for sick people themselves as well as proxy respondents. Others, such as the incidence of illness and the sex of household members, are clearly recalled and are known to other household members, as are actions taken in response to illness or important curative events such as injections.

5. Response errors on expenditures for treatment span a wide range. For expenditures greater than zero but less than 50 leones,* discrepancies were frequent, reflecting the small expenditures which occurred up to two weeks earlier and which were probably of no great importance to the respondent and therefore subject to recall error. Infrequent, large errors (recording errors or deliberate falsifications) also were found in this range, resulting in a high average error. Repeatability improved markedly with higher costs, in the range of 50-300 leones (which included nearly all PHC charges), perhaps reflecting the increased importance to the household of these greater amounts. The high level error for amounts still greater than this may have been due to deliberate misrepresentation on the original interviews, and is also amplified by the small number of cases in the highest categories.

How these errors should be interpreted depends on the use to be made of the data. The nature of the variances is critical: for expenditures for treatment, many small deviations from zero result in a low degree of correlation between the data sets, but whether a certain group spent an average of zero or 4 leones for treatment is probably not important when expenditures range up to the thousands. For the range of expenditures as a

*The official exchange rate was \$1US = Le 65 at the time of the survey. By comparison, agricultural workers could earn from Le 30 to Le 60 per day, depending on the region.

whole, it takes only a few cases of a respondent giving a wildly higher number on a reinterview, or a similar magnitude of interviewer recording error, to degrade the overall repeatability. A consistent system of dealing with outliers would seem essential.

Conclusions

While sampling errors continue to receive a substantial amount of attention in the design and implementation of health interview surveys, non-sampling errors are relatively ignored. This paper has argued the importance of measuring one aspect of non-sampling error, that of response reliability. A method of analysing the results of reinterviews has been presented and the example of the reinterviews from a morbidity and health expenditure survey in Sierra Leone has highlighted types of questions which are prone to this kind of error. Reinterviews are rarely conducted and the results of them are even less often reported, therefore there is little research with which to compare these results. However, given the burgeoning number of health interview surveys in developing countries being used to provide information on which to base policy, it is crucial that the quality of such surveys be more routinely measured and reported. The neglected but important topic of non-sampling errors needs to be more widely understood, measured and taken into account.

Note: The authors gratefully acknowledge the advice of Dr. Thierry Mertens and Mr. Simon Cousens, Department of Epidemiology and Population Sciences, London School of Hygiene and Tropical Medicine during the preparation of this paper. Field research was supported by UNICEF.

Table 1
1981 Post-enumeration survey, UK
Selected results of data errors and biases

RESPONSE CATEGORY	GROSS ERROR %	NET BIAS %	RELATIVE NET BIAS %
Shared use of bath or shower	7	-0.5	-29.1
Marital status = divorced	3	-0.1	-1.3
Travels to work by 'car pool'	68	2.4	142.7
Travels to work by bus	9	0.9	5.9

Source: adapted from Thomas (1987)¹

Table 2
Response errors calculated from age ranges

	ALL RESPONDENTS			SAME RESPONDENT			DIFFERENT RESPONDENT		
	GROSS ERROR %	NET BIAS %	RELATIVE NET BIAS %	GROSS ERROR %	NET BIAS %	RELATIVE NET BIAS %	GROSS ERROR %	NET BIAS %	RELATIVE NET BIAS %
0 years	16.0	0.5	+ 8.4	15.8	0.8	15.7	16.7	-1.1	-12.7
1-5 years	9.8	-1.7	-11.7	6.2	-1.3	-10.9	15.8	-4.9	-17.0
6-15 years	18.2	1.3	8.5	15.4	1.2	7.8	28.6	1.8	11.2
Adult	6.1	-0.1	- 0.2	3.4	0.8	- 1.1	20.0	4.3	9.2

Table 3
Response errors calculated from 1-year intervals

	ALL RESPONDENTS				SAME RESPONDENT				DIFFERENT RESPONDENT			
	NOT EXACT MATCH %	MEAN ERROR YRS	MEAN ERROR % AGE	ABS MEAN ERROR % AGE	NOT EXACT MATCH %	MEAN ERROR YRS	MEAN ERROR % AGE	ABS MEAN ERROR % AGE	NOT EXACT MATCH %	MEAN ERROR YRS	MEAN ERROR % AGE	ABS MEAN ERROR % AGE
0 years	16.0	0.05	--	--	15.8	0.06	--	--	16.7	0	--	--
1-5 years	19.6	-0.02	0.28	6.18	15.6	-0.07	2.78	4.38	30.0	+0.06	5.48	9.38
6-15 years	56.1	-0.39	4.08	15.68	51.1	-0.06	0.68	13.28	48.4	-1.50	-19.68	23.68
Adult	6.1				3.4				20.0			
All ages	13.0				12.0				17.4			

Table 4
Summary of non-sampling error

VARIABLE	TYPE	CASE ERROR ^a	SAMPLE ERROR ^b	'DIFFERENT' RESPONDENTS
Illness incidence	Binary	11%	2%	15% fewer cases reported
Age of ill household members	Continuous	13%	2%	Somewhat higher error
Sex of ill household members	Binary	0.5%	0.5%	Same error
Seriousness of illness	Binary	26%	3%	Nearly double error
Action taken	Multiple	19%	1%	Slightly greater error
Result of action taken	Multiple	28%	1.5%	Double error rates
Amount paid for treatment	Continuous	1% to 41% ^d	0% to -22%	60% greater error
Reason for non-medical action	Multiple	27%	2%	Not analyzed
Receiving an injection	Binary	10%	3%	Similar error
Availability of money	Binary	16%	1%	Much greater error
Source of money	Multiple	10%	2.5%	Similar error
Amount thought medical care would have cost	Continuous	17%	15%	Not analyzed

^aFor binary or multiple choice variables the 'case error' given is the mean of gross errors for all categories; error for individual categories may be much higher or lower. For continuous variables 'case error' is the mean of absolute errors for the entire range.

^bFor binary or multiple choice variables 'sample error' is the mean net bias for all categories. For continuous variables 'sample error' is the mean percent error for the entire range.

^cPercent difference in mean incidence rates.

^dDepends on price range - see text.

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Appendix 4:
Focus Group Transcripts

Sierra Leone Health Economics Survey: Focus Group Discussions

The body of the text consists of translations of the tape-recorded discussions. These are supplemented by notes made during the sessions by the field assistant supervisor J.S. Fornah. These notes appear in closed brackets: [].

The questions for the first discussion were in an English written format based on the objective of determining whether answers to some of the research questions could be obtained from community groups rather than by household questionnaires. Some questions were added spontaneously during the first discussion, and for subsequent group discussions the list of questions was revised as topics were elucidated and new ones arose.

If the tape translations are reasonably accurate, it seems as if many of the questions were not interpreted as intended by the moderators or by the discussants. Many of the responses also are not as to the point as expected, probably reflecting the gulf between the researcher's mode of thinking and the villagers. It will be necessary to re-read these transcripts several times to arrive at conclusions on some of the topics broached.

#1: KPETEMA 13 December 1989, Kenema District, Malegohun Chiefdom

Discussants: Mamie Jalloh, female farmer, married
Amadu Bah, Rice, cassava farmer
Patrick J. Bockarie, teacher and hunter
Bockarie Abdulai, coffee, cacao farmer, miner, works with cooperative.
Aruna Samal, coffee, cacao farmer
S.S. Morjoe, retired farmer, supported by children
Mamie Jeneba, farmer

Translated from Mende by Josephine A. Kamara

Field Supervisor Lansana Salankole is moderating. The principal investigator sits next to a field interviewer who translates for him, and feeds new questions back to the moderator. The group setting is in a courtyard of a house of an elder. There is a full moon, with some hazy clouds. Seven people have been selected from 10 picked by the chief. One man, a Temne speaker, has been asked to sit back down and is replaced by a woman who had been interviewed today. There are now five males and two females on the panel. About 30 other villagers are listening but rarely saying anything. A small amount of palm wine has been consumed already. The session, as all the rest, is begun with a prayer.

Introductions: (Moderator) Please don't think we are trying to pry into your business, but give us honest answers so we can help. This white man came all the way from England to find out why people die so easily, and how people manage to cure themselves, and how much you pay.

Teacher (introduces himself): There are 305 children in the school, going up to class 6. They often drop out of school for 4-5 months at a time.

- Q1:** How do you live in this town?
- A:** There's no other way but farming - coffee, cacao, kola, rice - that's how people survive.
- A:** There's another way to get money - bananas, coffee, kola. Many other people do this.
- Q2:** Do people save money at home in case of an emergency?
- A:** No, we spend it as soon as we get any and then find some more.
- A:** Our money is in the bush. We pick coffee and sell it when it is ready.
- Q3:** What if there is an emergency?
- A:** We have a big society (*osusu* or *Kompe*) - we agreed to help each other out if anything happens. If someone has no relatives, others will sell crops and just contribute for medical care, etc.
- Q4:** What if someone is not a member of the *osusu*?
- A:** If he has a relative in the *osusu*, the relative can recommend to the *osusu* chief that they loan money to the person.
- Q5:** What if there is no relative in the *osusu*?
- A:** We can still help out.
- Q6:** Is there anyone here who can lend money to people?
- A:** There isn't anyone here who does that. The money we manage to get just goes through our fingers and then we have to struggle to get more.
- A:** Sometimes we have cooperative employment, like for the mosque we built. Every day a different person pays the workers.
- A:** Some people lend money, usually people who have just sold crops. The loan is often repaid in kind with rice or other crops.
- A:** People can't afford to pay school fees - that's why kids drop out of school. (The teacher asked the children to bring Le 100 each since he had not received his salary. The parents refused, some saying 'I am a farmer, so you can be one too', and stopped them from going to school. He had formerly asked them to bring Le 2 every day, but when he asked for the lump sum the parents balked.)
- A:** A loan from the *osusu* carries the same interest as from other lenders - 3 for 2 (= 50% per month). Furthermore, sometimes *osusu* members can't afford the Le 2 contribution they must make every Friday.
- A:** There are a lot of different *osusus* - some have 8, 10, 15 members. They take Le 2 every week, but many can't make that much. People who don't pay for a long time get kicked out. If they are sympathetic, they (the *osusus*) just charge more interest for the arrears.

- A:** Sometimes we can get credit from the cooperative for six months or a year. It can be repaid in produce. But if people have earned enough from farming they wouldn't borrow money since they have trouble repaying it.
- Q7:** Is there any other way of borrowing from friends or relatives without pledging something?
- A:** It's not possible. To borrow Le 200 you have to promise a lot of produce or a part of your plantation. You feel bad since you know it's worth more than the amount borrowed.
- Q8:** Can you also pledge other property - radios, clothes?
- A:** Yes, but it's easy to lose them [radio, tape, pans, clothes] if the time is exceeded, unless the lender is sympathetic. Some people won't even charge profit [interest] but others will ask for a large profit to redeem it.
- A:** We can also borrow money against palm oil. A 10-gallon tin which costs Le 1800 is often given for a loan of Le 600.
- A:** Farmers who are enlarging farms may lend money in exchange for future labour. Le 60 per day is the rate for "heavy sweat", but when you're in difficulty you have no choice and may have to take as little as Le 30 per day.
- Q9:** How can you tell who has the most money?
- A:** If we knew, would we be worrying about how to get money?
- A:** You can tell by their plantations and houses.
- Q10:** How do you know?
- A:** If a man has a large plantation and the crops are good that year.
- A:** When someone is spreading coffee or cacao to dry over and over.
- Q11:** How could a doctor tell if someone has money?
- A:** If someone can pay or not pay - if they can pay the amount charged.
- Q12:** How many bags of coffee or cacao will make someone well off?
- A:** Five bags means God felt sorry for you.
- A:** Rich people can make a case against you if you mess around. But they will also help you if you go to them in need. Usually rich men have big families and their wives don't do heavy work on farms.
- Q13:** If someone is sick with malaria, how much do you expect to pay for treatment?
- A:** It depends how sick the person is. The doctor will make different charges.
- A:** If it's very serious the hospital will charge you Le 2000. You can't afford that money.

- Q14:** How much is it possible for a poor man to pay?
- A:** Ten cents or Le 2. Just a small amount would be best for me. I'm very poor and would beg the doctor.
- Q15:** If you took Le 0.50 from the house, would it disturb your budget?
- A:** No, but if I took Le 1.00 from the money I have at home I would have a hard time replacing it. If I had Le 20 I would take it all to the doctor, but if I gave it all to the doctor how would my family eat?
- Q16:** Would you pay the same amount for a small child as an adult (yourself)?
- A:** I would want to pay less because a child doesn't need the same treatment as grownups.
- A:** At Segbwema (mission hospital) there used to be free treatment for adults and children. Now it doesn't matter if you are poor or rich, adult or child, you pay the same. Transportation is also a problem - people can die before they reach the hospital.
- Q17:** If someone is really sick, will the chief or anyone else help them so they don't die?
- A:** Yes, it happens. People will get together and try to help. Often there is no transportation so they use native roots and leaves.
- Q18:** Won't the *osusu* help?
- A:** Yes they will, but transportation is the problem. It costs Le 300 to go to Segbwema or Kenema, and then the doctors will take Le 200. So even the *osusu* or rich people won't lend that much money to a poor farmer who will not be able to repay it.
- Q19:** Is the cost of transport the problem or is it the treatment costs?
- A:** We could take the sick to hospital by hammock, but then it will still cost a lot, so we stay at home and use native remedies.
- A:** Both are difficult. Before independence the whites used to help us with health care. For deliveries they'd give us baby clothes, food. Now it's all too expensive for us. We used to go to hospital even for a headache. Now we think that roots are better than white man's medicine for malaria because of the cost and efficacy.
- A:** If a sickness is not cured right away at hospital it costs money so they will take them back to the village.
- A:** A brother needed a hernia operation which cost Le 6000. If you only have one bag of coffee how can you afford it? We just keep them at home and give them roots, etc.
- A:** It's not easy to go to the big town - you have to walk all morning just to get to the main road, so how is a pregnant woman to get to hospital?
- A:** This land is fertile but we never see the money when we make plantations because of debts and expenses.

- Q20:** Has anyone had to sell land or plantations? How much would it cost you to have to sell land?
- A:** House problems, family affairs, etc., may all necessitate selling land or other property. Poverty causes us to pledge our plantations, and since the interest builds up they often can't be redeemed.
- Q21:** What if a parent dies and leaves some pledged property to a son or daughter?
- A:** Often people will not return the property and it will be lost.
- Q22:** Some people spend on societies and ceremonies. Why do people like to do this rather than spend on sickness?
- A:** We used to do it, but not now. Times are rough so we do it just a little. It's still important to put our kids in a society.
- A:** For me it would be more important to spend on a sickness than for a society. Everyone plans for happy occasions but nobody plans for sickness or other unhappy events.
- Q23:** Will people sell harvests for sickness, or only for ceremonies?
- A:** For a very serious illness people may pledge their farms for a period of several years to someone else. It's not the same as selling the farm since after the time is up the right to the crops is yours again. But if you want to pay back the money sooner it can't be done.
- A:** It's really the only way to get a lot of money in an emergency.
- A:** You can also go to a strong relative to borrow, if you can convince them that your farm will have a good crop.
- Q24:** Can you get money from someone without pledging anything?
- A:** Yes, someone who knows you well can help you to the extent that he is able.
- A:** For large amounts they will bring in another strong man to guarantee the loan. He would inspect the farm to see if it is worth the amount the owner wants to borrow.
- A:** The best way to borrow is to not be in a panic. Go to a rich person and explain your problem, and they will give you the money and tell you how much to repay each month.
- Q25:** Will people sell their food to pay for care?
- A:** Yes, people do sell their rice. I had to do it this past rainy season.
- Q26:** What would miners do in that case?
- A:** The people they work for would take care of the miner, and then would cut their salary for a few months.
- A:** Some diamond dealers don't make much money. At least they don't keep much money around the house so you can't always count on them for loans.

- A:** Diamond buyers will give loans to miners they know if they sign a note to sell them the next diamond they find.
- Q27:** Will they help you even if you don't promise them a diamond?
- A:** No, only if they know you often get diamonds. And they don't always have cash on hand either.
- Q28:** Do you think the rich and poor should pay the same for treatment?
- A:** There's no choice. If I'm sick I want the doctor to cure me.
- Q29:** Should the poor pay the same Le 200 as everyone else for some medicine? (??)
- A:** If someone really had the money they would bring it, so if it's possible they should treat (poor) people for free.
- A:** That person has a family. The doctor has to pay for medicine, he doesn't get it free, so the poor should pay a small amount.
- A:** We don't think the poor should pay the same as the rich, but they should give the doctor something to cover the cost of the medicine.
- A:** The doctor will sympathize more if you pay some small amount than if you pay nothing.
- Q30:** Is it fair to the rich if they cover the amounts the poor don't pay towards the price of the drugs?
- A:** It wouldn't hurt them, and it would be a big help to families.
- A:** It's true - man lives by man.
- A:** It's a big help, like if someone comes over at the clinic and offers to pay for someone who hasn't got enough. A poor man always lives by a rich man.
- Q31:** Would someone who received free treatment go home and announce it to everyone?
- A:** In Africa people have a lot of self-respect. They don't like to be identified as poor so not everyone would cheat. If you want to eat well you buy good food, and if you want to get better you pay for good treatment.
- A:** [People will pose as poor] A respectable man wouldn't do that.
- A:** If a child gets free treatment I wouldn't ask for the same, because I am a big person.
- A:** There are some people who God made without self-respect. They have money but won't spend it on themselves.
- A:** If everyone pays different prices it spoils it for everyone - no unity or organization will be left.
- A:** If a rich man pays more it will discourage the poor man.
- A:** The poor would prefer to pay a small amount, for their own self-respect and because they understand that medicine is not free.

- Q32:** Can you tell who is rich and who is poor?
- A:** Yes by the condition of their skin, clothes, and how they walk. If people never go to work on their farm, and just sit and buy other's produce they are rich.
- A:** If someone uses a lot of palm oil and good fish in the soup. If their skin is shiny and smooth they get good nourishment.
- A:** Also by how they dress in the village.
- Q33:** (Points) But she has nice clothes on now. Does it mean she has money?
- A:** These are ordinary clothes!
- Q34:** Is there anyone in this village you can go to to ask a favor quickly?
- A:** The first person is the town chief. The women have their own chief.
- A:** The only person we would trust and believe is the chief.
- Q35:** Does a man's wife know if her husband has had a good year and has money? (No responses)
- Q36:** Which months are the best months for you?
- A:** Now - when the harvests have begun.
- Q37:** And for the diamond diggers?
- A:** The dry season is [when we can work because the streams are almost dry] and we have enough to enjoy ourselves.
- A:** (Teacher) For me, I should get money every month. I work for the government and I'm happy if the money comes every month.
- A:** In dry season from December to May we [get enough palm oil and the women go fishing] really enjoy ourselves. We can buy new clothes, shoes. [During this period, we find what we eat for the remaining months.]
- A:** When the money comes we don't keep it around. It just goes on family expenses, school fees.
- Q38:** Can people accumulate Le 10,000 as a safeguard?
- A:** (Miner) My way is to get a diamond and sell it and get a full belly, then look for another one.
- Q39:** Would it be possible for people to contribute Le 400 during the dry season for a year's supply of medicines?
- A:** Yes, we could.
- A:** No, some of us have big families and can't afford to pay Le 400 for everyone. It's easy for you from the big cities but not here in a village.

A: It's not possible to pay Le 400 in one month.

A: Where do you think we can get enough to feed our families and also pay for medicines?

A: Different illnesses attack us each year. How can we be sure that we'll have the right medicine? (We won't know the right one to take). [If we get only certain drugs and a different illness befalls us that is not treated with those drugs we would die] The only thing we know for sure is that you should help us.

Q40: Who would store the drugs for you?

A: If we're sick and need the drugs we might have to bribe the person who is storing them for us. Who would that person be? He would have to be capable of keeping the tablets safe and know how to treat us. The rich people would bribe them to get more medicines even if we all paid Le 400. It would be better to have someone who could sell us the medicines at a low price.

Q41: You said there were people you could trust here. Don't you still trust them?

A: We trust the chief, but as a spokesman, not as a dispenser of drugs.

A: You haven't made it clear to us what we should do. We don't know the right prices - they charge us Le 100 for an injection, Le 800 for a delivery. We need to know the correct prices, like Le 10 for malaria, etc. So if the dispenser overcharges us he should be reported. Even when we go to Markdate (immunization) they make us pay Le 5 or they wouldn't vaccinate us. We can't help ourselves - you must tell us the right prices or we will always be at the mercy of the dispenser.

A: (Elder) When the drugs come, if I'm not your friend you won't give me any. We are not even honest to each other. Dishonesty and greed create all our difficulties. There's no mutual trust.

#2: GANDORHUN 17 December 1989, Kenema District, Niawa Chiefdom:

Discussants: Massa Kamara, head of women's society
Baindu Conteh, assistant to
Yatta Massaquoi, assistant to local TBA
? Tindia, blacksmith, farmer
Momadu Kpaka, mason
Abdulai Sannih, tailor
Alhaji Mustapha Conteh, farmer, Islamic teacher
Sheku Kpaka, farmer, rice and cash crops

(Note: Selection of participants seems biased towards elites such as the TBA and tradesmen.)

Translated from Mende by Josephine A. Kamara

Introduction: explained we didn't come with bad news, just want more information about their health. Where are the nearest medical facilities, etc. We will do the survey tomorrow and repeat some of these questions.

- Q1:** How do people earn cash money here?
- A:** By farming, gardening, through selling coffee, kola, cacao.
- Q2:** Is this true for everyone in town?
- A:** (Woman) Yes, it's true. Women also glean coffee after harvest - they can get as much as a bushel which they will sell for use on their children.
- Q3:** Do you have money for emergencies?
- A:** No, we sell the crops and spend the money right away. By the time enough money can be accumulated it's probably too late to save a sick patient. Kenema is the only place that is close enough.
- Q4:** How can you get money in an emergency?
- A:** We pledge important things, and repay with cash or with rice, other crops, or palm oil.
- A:** That is so, but poor people have to get a stronger person to vouch for them.
- Q5:** What about poor people with no farm or children or family?
- A:** We must tell the truth [refers to a situation where a poor woman hasn't enough for new robes.]
- A:** No, there is nobody except for relatives who can help a poor person.
- A:** We can borrow money on interest, but we may pay back double in six months. Some villagers, especially the Temnes from Kenema, prefer to borrow from buying agents rather than from other villagers. They loan money and collect cash crops if people don't repay with cash. They will take a bushel of coffee for a loan of Le 40. The bushel is worth Le 1000, but if someone is sick they have no choice.
- A:** Relatives can lend money if they have some to spare.
- A:** If someone is desperate he will take a sum of money and pledge his plantation. Until the money is repaid all the harvest goes to the lender, and after the time is expired the lender gets the entire farm.
- Q6:** Are there any families that can loan without pledging or interest, just on trust?
- A:** Only by selling crops - if get some Le 5000 you can manage until the next bags are ready.
- A:** Even with a brother you have to promise to repay. Even for Le 20 you may have to weed a farm [at Le 30 per day plus food]. For Le 1000-2000 you must give something for a guarantee. Everyone in the village is poor, there is nobody rich enough to lend this much without a guarantee.
- Q7:** How can you tell if someone has money?
- A:** It is difficult because people don't like to tell business to each other.

- A:** You can tell by the quality of the house.
- A:** They dress in clean clothes every day. A rich man is not hard to recognize.
- A:** If someone will stand for you (to repay a loan), you are probably a rich person.
- A:** Rich people will buy rice from poor farmers after harvest, and then resell it to the poor at higher prices during the rains.
- [People who can pay money outright are considered wealthy]
- Q8:** Is native medicine used here?
- A:** Yes, we boil leaves to make us sweat, or feel better if we have colds, fever, or stomach ache.
- Q9:** How much should a rich person pay in hospital?
- A:** It's the government's business because people get different treatments depending on whether they are rich or poor.
- A:** 5 leones is fair.
- Q10:** What about the poor?
- A:** I'd want free treatment. The poor simply have no money. It's not a question of paying Le 2 out of 60 which he might have in his pocket, because he hasn't got any.
- Q11:** Can any rich people afford to pay more than Le 5?
- A:** Yes, there are some, if they want good treatment. If I were rich, I wouldn't care if my relatives spent my last cent as long as I got well.
- A:** I'd tell my favourite wife to get some money from the hiding place, to give 200-300 leones to a friend or to the hospital to take care of me.
- A:** Rich or poor, you will do anything to cure yourself.
- Q12:** How much would you pay to cure a child?
- A:** Babies are different - they can't talk and are innocent so need to be treated and cured. But treatment for children is different than for adults so should cost less.
- A:** If it were my decision, all medicine and treatment should be free because it's hard to replace the money once it's spent.
- Q13:** Has anyone ever died because of not having any money?
- A:** Plenty - especially this year too many poor people died because of high transport costs. Transport is a threat to health - it costs Le 660 to go to Kenema for just one person.

- A:** Pregnant women can become sick suddenly. Now there's no transport and it's impossible to carry the woman on our backs. A rich man might have an old car and petrol, so could get the person to town. If you don't have this, you're finished. [There is no vehicle here because there's no rich person that could buy one.]
- A:** My son died three months ago because I waited days for transport but none came.
- Q14:** Has anyone had to sell their plantations because they had no money?
- A:** It happens often - all that people can offer a sick person is sympathy!
- A:** I'd give someone this lamp to keep if they'd lend me money.
- A:** I needed to take my wife to Segbwema but had only a little money. When I got there I needed more money. I sold my cassette player rather than borrowing because it is easier.
- A:** I had the same problem and lost my daughter.
- A:** If there is transport around you can borrow and get the sick person to the city.
- [Our main problem is not having vehicles plying this route: if someone is sick he could get a loan from friends or relatives.]
- Q15:** Why do you spend money on celebrations but not on treatment when you are sick, like initiations, where you spend so much money.
- A:** Nobody can afford to spend thousands on initiations here.
- A:** I lost a girl I wanted for a wife because I couldn't pay for initiation.
- (Question is repeated)
- A:** We should really be more ready to spend on people who are sick than on the societies.
- A:** If it is possible you should show your appreciation for your child, that she/he has grown to maturity. If a girl goes to a husband he will take care of her needs and you won't have to any more.
- A:** Nowadays the young die more than the old, so we should try to appreciate them more. It used to be that the old die and the young live.
- A:** [Woman] If I have 100 bags of rice and a friend is sick, I'd sell as many bags as necessary to help them.
- A:** Yes, it's true - this woman is the only one in the village who would do something like that.
- Q16:** Would you cut down on food to pay if someone was sick?
- A:** Gladly - I'd sell my rice and even cut our meals down until we were starving. (LAUGHTER) [If we are used to eating 10 cups we will reduce it to 4 cups per day.]

- Q17:** How much can you spend on food if you haven't got any rice?
- A:** Nothing - women find bush yams. God has planted them.
- A:** We eat bush yams in the rainy season. My wife was pregnant and ready to deliver but there was no food. We carried her on a hammock to where there would be food, but she died on the way.
- Q18:** Would you prefer to pay nothing for treatment if you are poor, some small amount, or the same for everyone?
- A:** We'd prefer to pay nothing.
- A:** It would be nice to organize to collect money for sick people.
- A:** The medicine costs money so you should expect to pay. [In our minds we have been used to free treatment in the past but now that things are tough one should pay some amount] Even to pay some small amount like 5-6 leones.
- A:** If possible we shouldn't let people die. Life is worth more than money.
- Q19:** Would you buy medicine from a trader instead of going to hospital?
- A:** Yes, but once it's finished you have nothing left.
- A:** I can manage 5-10 leones but not 100.
- Q20:** If poor people can get free treatment, will many rich people say they are poor?
- A:** There are people who will put on old clothes and say they have nothing. If people see a doctor curing poor people for free they will want it too.
- Q21:** Is there anyone who can tell who is poor? [This was not understood properly.]
- A:** If someone feeds a lot of people with no grumbling he is probably well off.
- A:** Or if a person builds a nice house.
- A:** If someone can pay all the hospital costs without borrowing they are doing well.
- A:** If someone can help someone without hesitating.
- A:** If someone has a car or a nice shop.
- Q22:** Whom do you trust to stand for you?
- A:** The town chief is the strongest voice in the town.
- Q23:** Who would you trust other than the chief?
- A:** There is an old man here who has lived longer than anyone else, who can tell who is rich and who is poor.

- A: The only rich man here is the one who buys cheap at harvest and sells it back in rainy season.
- A: Only the town chief, who 'owns' the town, would be believed. (All agree.)
- Q24: How much do you have during the rainy season?
- A: It depends on how many people you have to support. In the rainy season Le 2000 will not be enough if you have to feed 10 people. But in harvest season Le 2000 will last a long time.
- A: People with large plantations are rich. You can go to them and they will help you.
- A: The only time we have money is at harvest time.
- A: Someone who harvests 2 or 3 bags of coffee is doing well.
- Q25: Could people afford to pay Le 300 per person as payment for medicines the rest of the year at harvest time?
- A: Not everyone could afford it.
- Q26: What if it were Le 100 per person per month, for three months?
- A: Yes, at harvest time. You mean even for the children? (No, not for the children)
- A: Some people have no farms, they can't afford it. [Some would pay, others would not. Within a period of time some will be able, others can't. If the poor can't pay and they are our relatives, it won't hurt us if they are given free treatment.]
- Concluding comment: Transportation is our biggest problem. We need a clinic in the area.

#3 BARMOI, 15 January 1990 Port Loko District, Bureh Maconteh Kasseh Chiefdom:

Translated by M.I. Sesay from Temne

Occupations: farmer, farmer, farmer, farmer/Arabic teacher, farmer, farmer, farmer

- Q1: Are there any other occupations here?
- A: Yes, there are traders. We go to our farms and don't mind peoples' business.
- Q2: How many bushels do you have to cultivate to sustain your families the whole year?
- A: We don't measure it. Some cultivate just 1/2 bushel. It depends on what God gives us.

- A:** We cultivate as much as we can, maybe 4 or 5 bushels, but sometimes at harvest we don't get enough. I plant 5 bushels of rice, 3 pans of millet, some cassava - it will be enough for my family, but at times animals eat the grain.
- A:** At times we can get as much as 5:1, other times only 1:1 (harvested grain to planted seed).
- Q3:** What causes the fluctuation?
- A:** Rodents, and the work of nature. There's nothing we can do about it.
- Q4:** How much do you sell after harvest?
- A:** We don't sell, since we don't get enough for our own use.
[Some sell rice after harvest, others don't if the harvest is poor]
- Q5:** Why do other people sell their rice before the hungry season?
- A:** When we have an emergency we have to sell something, and all we have is rice. We have many debts and other needs.
- A:** If there is an emergency we have to borrow money from others, then we sell rice to repay the debt.
- A:** When there is no more rice in the rainy season, we start all over by borrowing again.
- Q6:** When you've sold all your rice and need more, where do you get the money?
- A:** We borrow money from others to buy rice, then repay it in rice after the harvest. [People borrow from others or pledge their crops or land. At times they sell their crops. Some pledge their gardens.]
- Q7:** How do you repay the money you borrow during the rainy season?
- A:** One way is to work a part of the lender's farm to repay the debt.
- A:** When we borrow we have to pay interest.
[Others sell their crops again or they finally go into exile from that chiefdom because of fear.]
- Q8:** Do you mean interest in kind or on money?
- A:** We borrow money and repay in rice. We get Le 180-200 for a bushel. That's why it is interest - the cost of the rice is far more than that.
- A:** If you don't pay the rice back, they (lenders) will take you to court.
- Q9:** When there is an emergency such as an illness or a dispute, where do you get the money to settle your problems?
- A:** If your wife's father dies you have a lot of funeral expenses - Le 1000 for a winding cloth, and then the 40th day ceremony. On this occasion you must borrow since the expenses are great.

- A:** Some will pledge their farm land (not land for building), some will pledge their garden or oranges. There is no stipulated time - the lender keeps the harvest until you repay him.
- Q10:** Where do you get money to redeem your pledge?
- A:** We either pay back in rice or else we have to leave the area!
- A:** If we pledge land and can't get the rice to redeem it, you can ask the person to give you back your land so you can work the land to pay him back with rice.
- A:** But you'll have to pay much more. First a partial cash payment, then interest in the form of rice since you are working for yourself and not for him.
- Q11:** Can poor people borrow money?
- A:** Yes, but it has to be from a relative.
- A:** They will need a guarantor if they borrow from a non-relative. Poor people aren't trusted. When they can't repay the loan they prefer to go to court, which will grant them ample time to repay.
- Q12:** If poor people borrow money how do they manage to repay it?
- A:** They do manual labour. Some do cassava farming, some get palm kernels to make palm oil, and other jobs. They must be trusted to repay or else nobody will loan.
- Q13:** Which yields more, farming or trading?
- A:** If you have livestock or fowl you'll have money very soon.
- A:** The next is a garden, for cassava, peppers, potatoes. From these you can get a quick return.
- A:** They will not make you rich but they will assist you very quickly.
- A:** Farming rice will never get us rich. There isn't enough for our own consumption after harvest.
- A:** Most of the money we borrow comes from traders.
- A:** (Referring to Q12) There are no truly poor people here. Only the ones who can't work are poor. As long as you can work and get some money you may be broke at times, but you're not a poor man.
- Q14:** Why do most people prefer injections to tablets?
- A:** We need to recover as quickly as possible.
- A:** The 'doctors' give their opinion that we should have an injection.
- A:** When you get an injection you can feel better by the time you get back home.
- A:** Some people find it difficult to swallow tablets.
- A:** I only prefer them when I have severe pain. I prefer tablets when I just have fever.

- Q15:** Do people get injections for malaria?
- A:** There are tablets which they give you if you say you are feeling cold.
- A:** We usually don't ask for injections for malaria. The doctor (at PHU) can tell us if we need one.
- Q16:** If tablets and injections cure equally well, and the injections cost a bit more, which would you prefer?
- A:** Tablets.
- A:** Most people would prefer the injection because if you go to the PHU and only get tablets you don't think they are treating you seriously. I prefer injections.
- A:** In order to get a good reputation the dispensers give injections to satisfy patients' desire to be cured quickly.
- A:** Even if you have a sickness which doesn't require an injection, you will recover faster if you receive one.
- A:** It depends on what you are used to - if your body is used to getting injections you should have them. If it's tablets then that's what you need.
- Q17:** When you buy drugs from peddlers, how do you know they are good for your particular illness?
- A:** If you see the peddler has the same drug you received at the hospital the last time you had the same attack, you can buy it.
- A:** As soon as the peddler comes into town he shouts "I have medicine for headaches", and so on, so if you have these problems you buy.
- A:** When you ask him he will show you the bottle of tablets which has a picture of a person holding their waist, head, etc., so you know that's the right medicine.
- A:** All this is due to ignorance. If the government has a qualified dispenser, that is where you should go. Anyone who buys from a peddler does it out of ignorance in that case.
- Q18:** Is there a difference in price?
- A:** Yes, the peddlers are more costly than the PHU.
- Q19:** Then why do you buy from them?
- A:** Sometimes we go to the PHU and he gives a diagnosis but doesn't have the drug, so he sends us out to buy the medicine. Then next time we won't bother going to the PHU first - we'll just buy the same drug from the peddler.
- A:** Some people are far off from the PHU so have to buy from peddlers.
- A:** Some people are afraid to go to the PHU because of the price they are charged. So if they have only Le 2 or Le 10 they go to the peddlers.

- Q20:** Do you know anyone who got sick and died because of lack of money to go to hospital?
- A:** Pa Samba had asthma. He was sick for a long time because he never went to the hospital.
- A:** He was a farmer and also produced palm oil. But when he fell ill he couldn't farm or produce palm oil any more.
- Q21:** Do you have any sort of mutual aid?
- A:** Now we do but at that time we didn't.
- Q22:** Do you know anyone who sold any of their property in order to go to hospital?
- A:** I was a victim of this: I had to sell my wife's groundnuts because of the pain I was having.
- A:** I sold some of my clothes to go to the Eye Hospital. I sold some for 10, 30, 50 leones but I don't remember the total I spent.
- A:** I also sold a bushel of groundnuts before the time when I could get a good price.
- Q23:** If you are sick and go to a PHU and are asked to pay Le 60, how can you manage to pay it?
- A:** (The crowd all said that they wouldn't have Le 60, so it was put to a vote. 4 said they would have it, the rest, about 50 people, said they wouldn't)
- Q24:** You who don't have the money - what would you do to get it?
- A:** I'd go to a relative and be given some money, then I would borrow the balance.
- A:** I'd borrow from other people.
- Q25:** Why do people spend money on feasts like *bundu*, but can't afford to go to hospital?
- A:** Only those that can afford to do that do it. The others don't do it.
- A:** (Further support) All of us are not equal.
- Q26:** Are there any people who have [cash crops like] oranges, potatoes, etc.?
- A:** (Oranges, cassava, pepper, and tomatoes were named. Only 2 out of 6 did not have any cash crops)
- A:** I just planted and haven't harvested any yet.
- Q27:** Are there any other comments before we finish?
- A:** If you see someone making a feast, he's not making it on his own. He will send to his other relatives. Everyone will contribute something - money, rice, fowl, goats. But when it happens to other people you must contribute too, or nobody will give to yours.

#4 ROBIS 20 January 1990, Port Loko District, Buya Romende Chiefdom:

(Outdoors, late afternoon, discussion held after household interviews)

Discussants: 5 male farmers, 2 female farmers, 1 female trader

Sorie Beah, farmer, - rice, cash crops

Santigie Kamara, farmer

Kapr Fallah, farmer

Fatmata Mansaray, petty trader living in Makeni

Sama Kamara, farmer

Mariatu Kanu, farmer

Translated from Temne by: M.I. Sesay

Q1: Where do you get cash for such activities as school fees, clothes, etc.?

A: We have no other way than selling rice to cover debts, or arrange for a funeral.

A: Our farms include groundnuts, peppers, corn, etc.

Q2: (To trader) How much profit do you make per day?

A: I can make Le 100-150 (but she trades in Makeni - she was just in Robis visiting her parents.)

**Female: When you came this morning, you interviewed only a few houses, and only the men!
(Explanation given)**

Q3: What kind of illness will lead people to hospital, to use native herbs, or to use drugs from the market?

[Cough and hernia]

A: Cough - if I feel my sides, then I'll go to hospital.

A: When we do our farmwork we get general bone aches. This makes us go to hospital.

A: It's only when it is serious, - when you can't move on your own. But for minor things we won't go. [Any ailment that gets worse and prevents you from doing work.]

Q4: If you have to borrow money to go to hospital, how will you repay it?

A: When we get better we have to sell our rice to pay the debt.

A: Either we sell the rice, or before (if it isn't too serious and one can still move) we go to the hospital we pledge property to get cash.

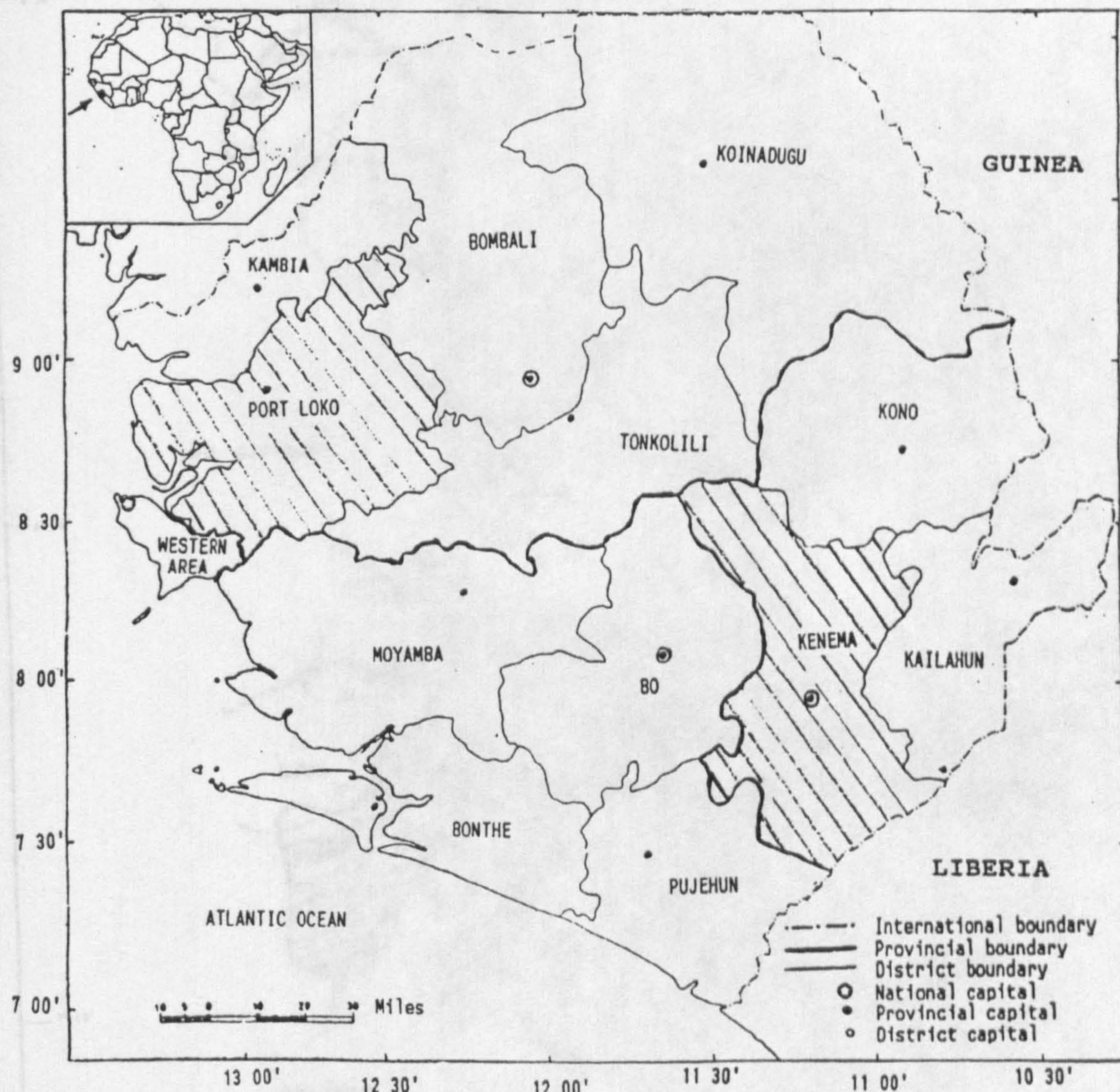
- Q5:** What will you do first in an emergency at a time close to the rains, if you have rice at that moment - sell the rice or try to borrow money?
- A:** We'll try first to sell the rice, but if there are no buyers we'll borrow. Then later sell the rice to repay it.
- A:** We'll first try to borrow money and if we don't succeed we'll come back and sell the rice.
- Q6:** Towards the hungry season and you know your stock of rice is very low, so you borrow money - where do you get money in an emergency?
- A:** I'll tell you how. I had a hernia attack while working on my farm. There was no money. I was put into a hammock. The family had to borrow Le 100 and I was taken to Mabesseneh. I went back to the farm, harvested the rice, and repaid the debt. [Le 100 two years previously is equivalent to about Le 400 currently.]
- Q7:** How much can you borrow for a bushel of rice?
- A:** Le 200, but if we sell it we get Le 400.
- A:** If we have an emergency we borrow money, then after harvest we sell the rice to the lender.
- Q8:** Does everyone in the village have the opportunity to borrow money?
- A:** There are people who can't get anyone to lend them money.
- A:** It's because they don't repay you and give excuses. After a while everyone in the village knows about it and won't lend.
- A:** Some will come to you in secret to borrow money and then not repay it. Then they start arguing with you and it will take a long time for you to get the money. So the next time you don't lend them.
- A:** Others who don't borrow money are sick people. Nobody will lend them because they know they can't work and can't pay them back.
- Q9:** How much will you be able to pay for fever in a PHU or hospital?
- A:** We can't know the amount except if the doctor tells the amount.
- A:** You might have Le 20 with you so you'd ask the dispenser to do something for you. If he says it's too little you have no choice but to go back home and get more. But if he asks only for the Le 20 it would be convenient for us.
- A:** If it would cost more than Le 20 we'd have to borrow.
- Q10:** What if malaria treatment cost Le 40?
- A:** We'd have to borrow.

- Q11:** Apart from borrowing or pledging, are there other ways to get money for these purposes?
- A:** No, only to sell rice, pledge other properties, or sell belongings.
- Q12:** Then if you've sold all your rice by hungry season, where will you get money to buy more rice?
- A:** We go to other people again, then after harvest we pay them back in cash or in kind.
- Q13:** Do you pay interest in that case?
- A:** No. ["For now, people don't loan on interest" - previously described pledging is not considered usurious.]
- Q14:** How much rice do you have to cultivate to last your family through the year?
- A:** It depends on the size of the family and if the harvest is good. 3 bushels could last in a good year; sometimes you need 6.
- Q15:** What if malaria treatment cost Le 40?
- A:** We'd have to borrow.
- Q16:** How would you repay it?
- A:** Wait until after the harvest, then we'd pay it back.
- Q17:** Are there people who didn't eat for 1 or 2 days during the rainy season?
- A:** Yes - many. Some will only eat cassava for a 1 or 2 day period.
- Q18:** Were they able to provide the cassava during that time?
- A:** Yes, we plant enough. We are cultivating it so it is ready when the rice is finished.
- Q19:** Why do people prefer to spend a lot of money on feasts but can't afford to go to the hospital?
[Laughter]
- A:** [Older man] Whoever does that is a fool! For me, I will just call my family and do the circumcision, and eat what we have around. I won't call a lot of people and have to buy food. Only those who are wealthy enough can have the chance to do that.
- A:** [Younger, well-dressed man] The people are not fools. All our ancestors did it, so we must also. We have to do it to our children, so it has become a sort of law that we have to do it. We're trying to follow a tradition.
- A:** [Woman] It depends how you stand - if you have money you do it [go along with your cult]. Those without a lot don't have to do it [do it secretly without making any feast].
- A:** It's only wealthy people who do it. They spend as much as possible and still have something left afterwards.

- A: [Woman] If I have less than enough rice I'll talk to the child to leave it for next year, so we won't be too pressed.
- Q20: Does anyone else have anything to say about paying for illness?
- A: For hernia, we could manage Le 200 without borrowing money. We can save that much from farming. But for body pains and fever Le 20 would be convenient. If they ask for Le 2000 we have to go into debt and won't even be able to maintain our houses [and many people die].
- Q21: If poor people can pay less than the actual cost of the operation, the rich will have to pay more than the cost price. Is that fair to them?
- A: It is if they agree to pay.
- A: It's a good idea but the rich man will not agree to pay more than the cost price [the poor man pays less]. They should make a reduction for the rich also, as well as the poor. The poor man's reduction must be more than the rich man's. [Wealthy people should pay more actually but unless the charges are done in secret the wealthy won't agree to this.]
- A: The rich man must not be informed that he is paying more than the cost price or he won't accept it.
- A: There are many illnesses in this area, and many people are so poor that they can't go to hospital. We depend only on farm work so if the harvest is bad we're in trouble.
- A: Also our water is bad, especially in the dry season.
- Q22: How much would everyone be able to contribute to improve the water?
- A: Since there are many of us, everyone who drinks water will be able to contribute Le 20 each.
- A: If we could borrow seeds, that would be another great help to us.
- A: We don't have any good toilets or roads and no water. So we'd be pleased if you could get these things for us.
- Q23: Do you have enough labour to do the farm work?
- A: Yes, we have many wives and children. I have 3 wives and 6 children. If I could borrow the seed we could do the work.
- A: Because of poverty we can't pay school fees - now the children are all doing farm work.
- A: Even our livestock get sick and eventually die because we have no assistance.

Appendix 5:
Maps and Photos

SIERRA LEONE

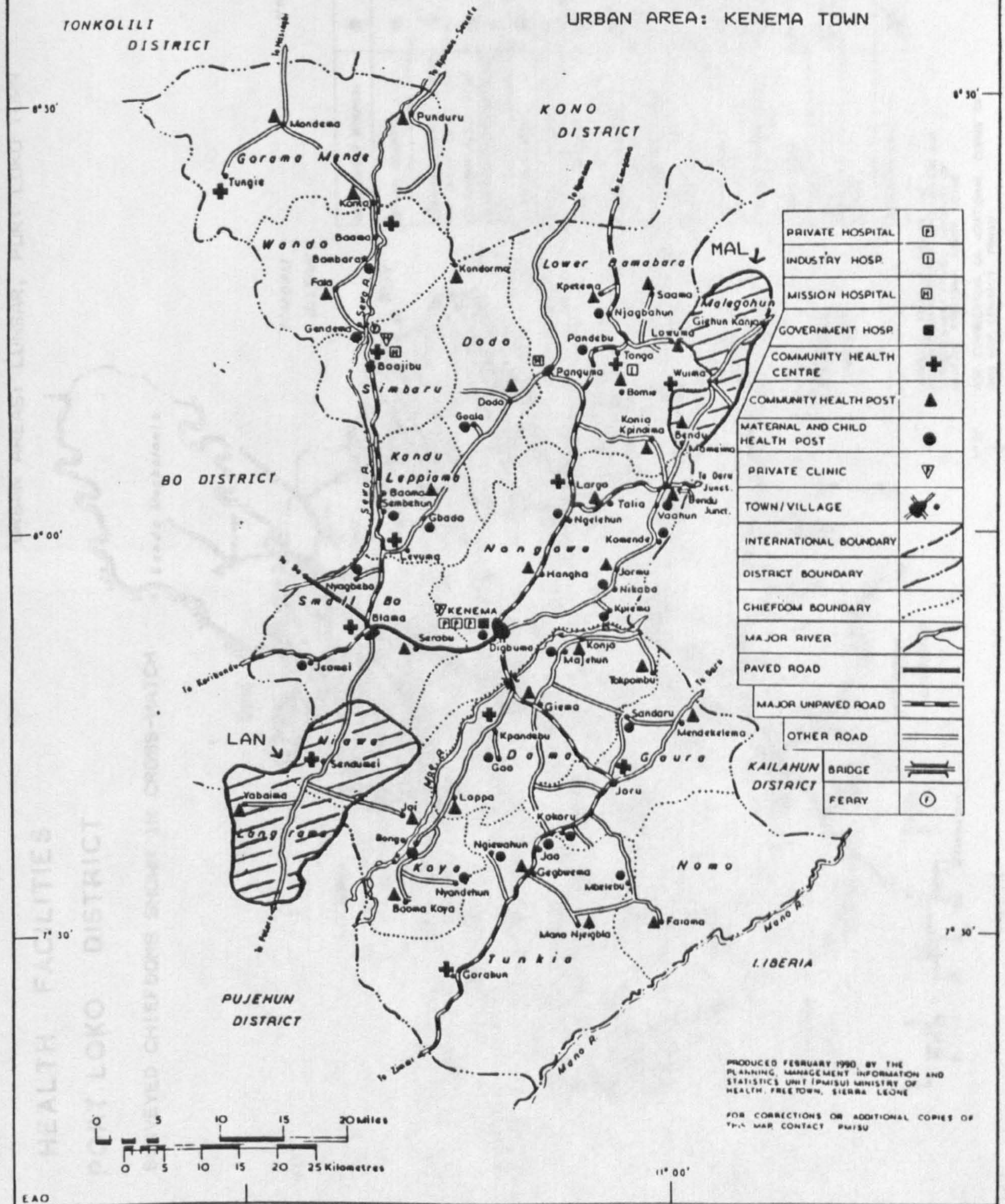


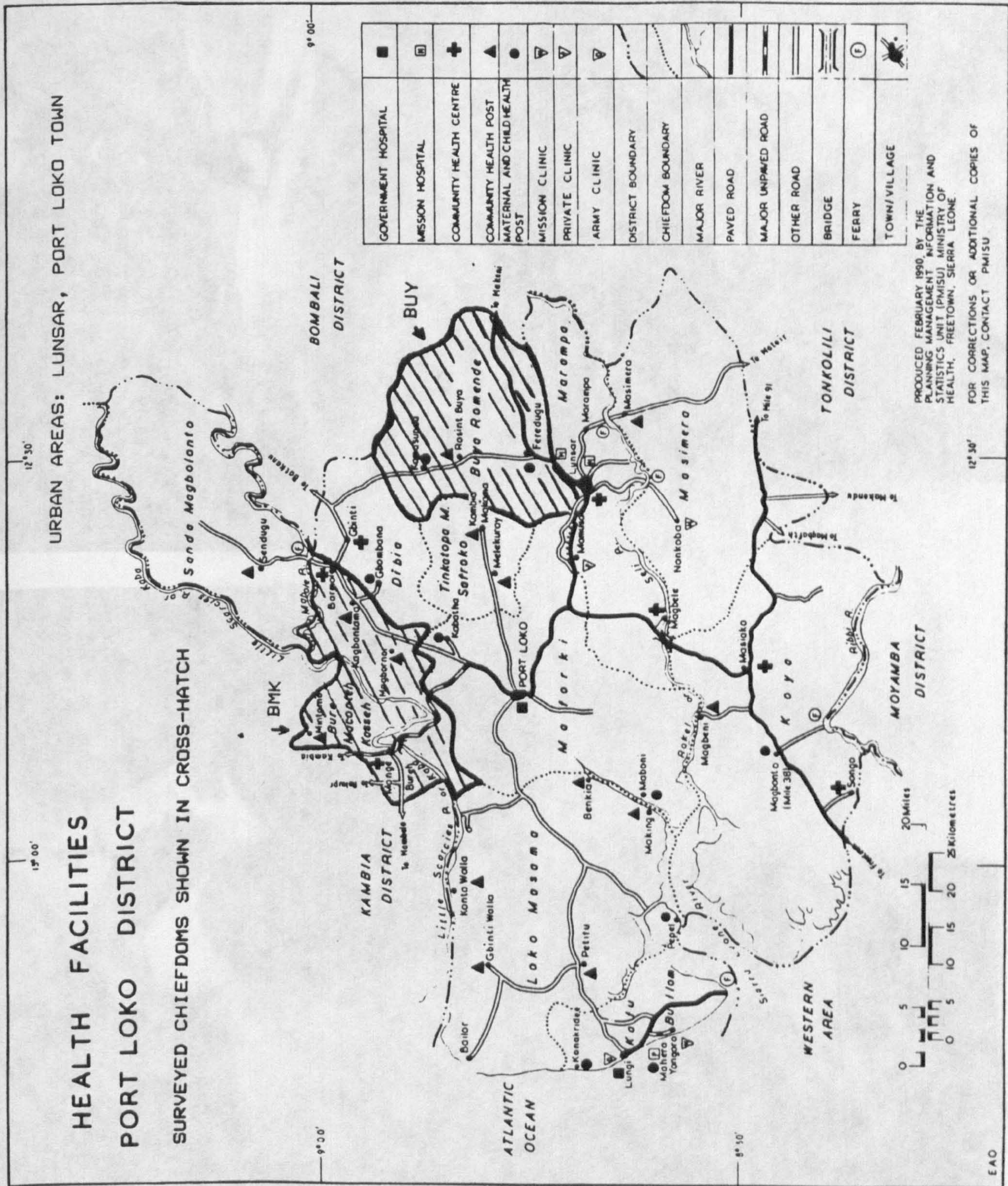
SURVEYED DISTRICTS SHOWN IN CROSS-HATCH

HEALTH FACILITIES KENEMA DISTRICT

SURVEYED CHIEFDOMS SHOWN IN CROSS-HATCH

URBAN AREA: KENEMA TOWN







upper left:
young rice planters,
Port Loko district

upper right:
drying cacao and rice,
Kenema district

lower left:
interview team in
BNK chiefdom

lower right:
difficult access to
Njala village (MAL)





upper left:
focus group #4, Robis

upper right:
village elders with
Dr CW Kamara (right)

lower left:
household interview
cum case study

lower right:
interview with
extended family

Appendix 6:

Questionnaires and Other Survey Instruments

Dry season household questionnaire with some reinterview data

Rainy season followup household questionnaire

Village data form

RECHECK

CHF: BHK: BUY: VILLAGE/TOWN: BURKEH VILL. NR: 2 HH NR: 26

Sierra Leone Health Economics Survey
HOH/PHISU - UNICEF - LSHTM

1. Enumerator Sam Givens No. 11 Date 18/1/90

"We want to ask you some questions which will help us learn about what people here do when they get sick. The information will only be used to HELP US LEARN MORE ABOUT THE HEALTH PROBLEMS in this chiefdom, and all your answers will be confidential. I will not even write your name on this paper if you prefer. Will you help us by trying to give us only correct answers?"

2. Status in household of the person(s) interviewed Head #: 1 Sex M
3. Household structure: (IF THE HOUSEHOLD IS VERY LARGE, ASK FOR ALL NAMES BUT ONLY WRITE DOWN THE HEAD, WIVES, SCHOOL ATTENDERS, AND THE SICK MEMBERS) *CODES

MODULE 2

READ THE LIST OF SYMPTOMS FIRST!

First Names of All household members or A (M/F) School? # ACUTE illness last 2 weeks SERIOUS? Y.N.Chr.OK

1	Mohamed	A	M				
2	Ramatu	A	F				
3	Memun a	A	F				
4	Gaima	6	F	✓			
5	Koloneh	6	F	✓	Severe cough	Y	
6	Bassay	4	M				
7	Kadiatu	A	F		Headache	Y	
8	Nandoy	A	F		palpitation		
9	Gibrilla	5	M	✓			
10	Yenisa	3	M				
11	Kadon	A	F				
12	Isatu	A	F				
13	Hassana	A	M				
14	pa Alpha	A	M		Joint pains	cr Y	
15	Alie	12	M				
16							
17							
18							

head 1
spouse 2
child 3
parent 4
other rel. 5
other 6

Supervisor:
TOTAL: 15

0-15: 6

Schl: 3

S.Ill: 3

NS.Ill: 0

U1 YEAR: 0

U5 YEAR: 1

U10 YEAR: 5

ENUMERATOR: Num
chronically ill
treated working
working adults:
1

Supervisor

[Signature]

HM Nr: 26 Supervisor: Age: 6 Sex: F Ill: 4 Sr: Y *** Age: 4 Sex: F Ill: 16 Sr: Y

ILLNESS RECORD: *****

PATIENT Nr. 1 Name Kolaneh

* PATIENT Nr. 2 Name Kadia

FIRST ACTION SECOND ACTION

FIRST ACTION SECOND ACTION

ACTION TAKEN

4 (4) 1

7 (7) 4 (4)

1 GOVERNMENT HOSPITAL
2 PHU
3 MISSION HOSPITAL

4 DRUGS FROM MARKET/DEALER
5 TRADITIONAL HEALER/HERBALIST
6 DISPENSER/NURSE (PRIVATELY)

7 NATIVE HERBS, SALF, ETC
8 PRIVATE DOCTOR/HOSPITAL

9 HAD MEDICINE AT HOME
10 NO TREATMENT
99 DON'T REMEMBER/DON'T KNOW

RESULT

1 GOT BETTER 2 GOT SLIGHTLY BETTER 3 GOT WORSE 4 REMAINED THE SAME 5 STILL UNDER TREATMENT 6 DIED 99 DON'T KNOW

2 (2) 1

2 (2) 4 (4)

IF PAYMENTS WERE MADE, COMPLETE THE NEXT PART (don't know = 999)

AMOUNT CHARGED
PAID/OWNED PROVIDER

Le: 110 (110) Le: 140 (140)

PAID MEDICINES

Le: 110 (110) Le: 140 (140)

PAID TRAVEL FOR ALL

Le: 110 (110) Le: 140 (140)

PAID OTHER COSTS

Le: 110 (110) Le: 140 (140)

OR TOTAL

Le: 110 (110) Le: 140 (140)

RECEIVED AN INJECTION? (Y/N) N (N) 1

ENOUGH MONEY AVAILABLE (Y/N) N (N) 1
in house/savings?

If above answer was NO,
HOW WAS MONEY OBTAINED

1 1 1 1 1 1 1 1 1 1

1 SOLD RICE/FOOD CROP
2 SOLD/PLEDGED CASH CROP
3 SOLD POSSESSIONS
4 SOLD LAND/FARM TOOLS (see 19)
5 PLEDGED OTHER PROPERTY
6 BORROW BANK/OR (999)

7 BORROW FROM MONEYLENDER
8 REC/GET GIFT/SUBSCRIPTION
9 BORROW RELATIVE/FRIEND
10 PRODUCED/CUT FOR SALE
11 SOLD LIVESTOCK/FOUL
12 REDUCED FOOD PURCHASES

13 REDUCED OTHER PURCHASES
14 DEDUCTED FROM SALARY
15 ON TRUST-WILL PAY AFTER
TREATMENT IS COMPLETED
16 HAD SOME MONEY AT HOME
17 USED BUSINESS CAPITAL

18 PAID IN KIND
19 PLEDGED PLANTATION/FARM
20 DID EXTRA LABOUR
90 OTHER (SPECIFY)
99 DON'T REMEMBER/DON'T KNOW

IF THE ACTION TAKEN WAS 4, 5, 7, OR 10, COMPLETE THE NEXT PART

MAIN REASON FOR THIS CHOICE 4 (4) 1

4 (4) 4

1 THOUGHT NOT SERIOUS/ 2 GOT BETTER SOON AFTER BEING SICK/ 3 HAD MONEY BUT NO TRANSPORT AVAILABLE, OR TOO FAR TO TRAVEL/ 4 NOT ENOUGH MONEY FOR DOCTOR, PHU, OR MEDICINES/ 5 DON'T LIKE GOING TO PHU, DISPENSER, HOSPITAL/ 6 THINK MEDICINES UNAVAILABLE AT PHU/ 7 DOCTOR NOT EFFECTIVE (TRADITIONAL TREATMENT IS MORE EFFECTIVE FOR THIS PROBLEM)/ 8 KNEW SELF-TREATMENT/ 9 OTHER (SPECIFY)/ 10 PHU WAS CLOSED/ 99 DON'T KNOW

If above answer was 4,

AMOUNT THOUGHT would have cost for TREATMENT & TRANSPORT

Le: 999 (999) Le: 999 (999)

NEXT ACTION?

NEXT ACTION?

Supervisor

HM Nr: 26 Supervisor: Age: (A) Sex: (M) Ill: 17 Sr: (N) Age: Sex: Ill: Sr:

ILLNESS RECORD: *****

PATIENT Nr.3 Name Pa Alpha * PATIENT Nr.4 Name

FIRST ACTION SECOND ACTION

FIRST ACTION SECOND ACTION

ACTION TAKEN

5 (r)

- 1 GOVERNMENT HOSPITAL
2 PHU
3 MISSION HOSPITAL

- 4 DRUGS FROM MARKET/PEALER
5 TRADITIONAL HEALER/HERBALIST
6 DISPENSER/NURSE (PRIVATELY)

- 7 NATIVE HERBS, SALT, ETC
8 PRIVATE DOCTOR/HOSPITAL

- 9 HAD MEDICINE AT HOME
10 NO TREATMENT
99 DON'T REMEMBER/DON'T KNOW

RESULT

4 (u)

- 1 GOT BETTER 2 GOT SLIGHTLY BETTER 3 GOT WORSE 4 REMAINED THE SAME 5 STILL UNDER TREATMENT 6 DIED 99 DON'T KNOW

IF PAYMENTS WERE MADE, COMPLETE THE NEXT PART (don't know = 999)

AMOUNT CHARGED

Le: 1000 (000)

PAID/OWED PROVIDER

Le: 600 (600)

PAID MEDICINES

Le: Le:

PAID TRAVEL FOR ALL

Le: Le:

PAID OTHER COSTS

Le: Le:

OR TOTAL

Le: Le:

RECEIVED AN INJECTION? (Y/N)

- (-)

ENOUGH MONEY AVAILABLE (Y/N)
in house/savings?

N (N)

If above answer was NO,
HOW WAS MONEY OBTAINED

16 9

- 1 SOLD RICE/FOOD CROP
2 SOLD/PLEGGED CASH CROP
3 SOLD POSSESSIONS
4 SOLD LAND/FARM TOOLS (see 19)
5 PLEDGED OTHER PROPERTY
6 BORROW BANK/ON CREDIT

- 7 BORROW FROM MONEYLENDER
8 REG/RET GIFT/SUBSCRIPTION
9 BORROW RELATIVE/FRIEND
10 PRODUCED/CUT FOR SALE
11 SOLD LIVESTOCK/FOUL
12 REDUCED FOOD PURCHASES

- 13 REDUCED OTHER PURCHASES
14 DEDUCTED FROM SALARY
15 ON TRUST-WILL PAY AFTER
TREATMENT IS COMPLETED
16 HAD SOME MONEY AT HOME
17 USED BUSINESS CAPITAL

- 18 PAID IN KIND
19 PLEDGED PLANTATION/FARM
20 DID EXTRA LABOUR
98 OTHER (SPECIFY)
99 DON'T REMEMBER/DON'T KNOW

IF THE ACTION TAKEN WAS 4, 5, 7, OR 10, COMPLETE THE NEXT PART

MAIN REASON FOR THIS CHOICE

7 (u)

- 1 THOUGHT NOT SERIOUS/ 2 GOT BETTER SOON AFTER BEING SICK/ 3 HAD MONEY BUT NO TRANSPORT AVAILABLE, OR TOO FAR TO TRAVEL/ 4 NOT ENOUGH MONEY /
DOCTOR, PHU, or MEDICINES/ 5 DON'T LIKE GOING TO PHU, DISPENSER, HOSPITAL/ 6 THINK MEDICINES UNAVAILABLE AT PHU/ 7 DOCTOR NOT EFFECTIVE (TRADI-
TIONAL TREATMENT IS MORE EFFECTIVE FOR THIS PROBLEM)/ 8 KNEW SELF-TREATMENT/ 9 OTHER (SPECIFY)/ 10 PHU WAS CLOSED/ 99 DON'T KNOW

If above answer was 4,

AMOUNT THOUGHT would have
cost for TREATMENT & TRANSPORT

Le: Le:
(999 = don't know)

NEXT ACTION?

NEXT ACTION?

* Bring to the
Hospital several
times, but no improvement.

3 Supervisor

CHF: BHK: BUY: ☒ VILLAGE/TOWN: Burek VILL NR: 2 HH NR: 25

"Has any member of this household died in the last 12 months, including newborns and infants?" (Y/N) Y CAUSE(S) OF DEATH Nr.1 Swollen body Nr.2 codes: 15

Was the person sick before dying? (Y/N) Y IF yes, CONTINUE:

DECEASED Nr 1 Age: 16 Sex: M * DECEASED Nr 2 Age: Sex:

ACTION TAKEN	FIRST ACTION	SECOND ACTION	FIRST ACTION	SECOND ACTION
	<u>3</u>	<u> </u>	<u> </u>	<u> </u>

- | | | | |
|-----------------------|--------------------------------|---------------------------|------------------------------|
| 1 GOVERNMENT HOSPITAL | 4 DRUGS FROM MARKET/PEDBLER | 7 NATIVE HERBS, SALT, ETC | 10 NO TREATMENT |
| 2 PHU | 5 TRADITIONAL HEALER/HERBALIST | 8 PRIVATE DOCTOR/HOSPITAL | 11 DIED SUDDENLY |
| 3 MISSION HOSPITAL | 6 DISPENSER (PRIVATELY) | 9 HAD MEDICINE AT HOME | 99 DON'T REMEMBER/DON'T KNOW |

IF PAYMENTS WERE MADE, COMPLETE THE NEXT PART

TOTAL ALL COSTS	Le: <u>800</u>	Le: <u> </u>	Le: <u> </u>	Le: <u> </u>
-----------------	----------------	-----------------	-----------------	-----------------

ENOUGH MONEY AVAILABLE IN HOUSE OR SAVINGS?	Y <input checked="" type="checkbox"/> N <u> </u>	Y <u> </u> N <u> </u>	Y <u> </u> N <u> </u>	Y <u> </u> N <u> </u>
---	---	-----------------------------	-----------------------------	-----------------------------

If above answer was NO, HOW WAS MONEY OBTAINED

<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
-------------	-------------	-------------	-------------	-------------

- | | | | |
|--------------------------|-----------------------------|----------------------------|----------------------------|
| 1 SOLD RICE/FOOD CROP | 6 BORROW BANK/OR OTHER | 11 SOLD LIVESTOCK/POUL | 16 HAD SOME MONEY AT HOME |
| 2 SOLD/PLEGGED CASH CROP | 7 BORROW FROM MONEYLENDER | 12 REDUCED FOOD PURCHASES | 17 USED BUSINESS CAPITAL |
| 3 SOLD POSSESSIONS | 8 DEG/GET-GIFT/SUBSCRIPTION | 13 REDUCED OTHER PURCHASES | 18 PAID IN KIND |
| 4 SOLD LAND/FARM TOOLS | 9 BORROW RELATIVE/FRIEND | 14 REDUCED FROM SALARY | 19 PLEDGED PLANTATION/FARM |
| 5 PLEDGED OTHER PROPERTY | 10 PRODUCED/BOY FOR SALE | 15 OBTAINED ON TRUST | 98 OTHER (SPECIFY) |
| | | | 99 DON'T REMEMBER |

IF THE ACTION TAKEN WAS 4, 5, 7, or 10, COMPLETE THE NEXT PART

REASON FOR THIS CHOICE

<u> </u>	<u> </u>	<u> </u>	<u> </u>
-------------	-------------	-------------	-------------

- 1 THOUGHT NOT SERIOUS/ 2 GOT BETTER SOON AFTER BEING SICK/ 3 HAD MONEY BUT NO TRANSPORT AVAILABLE, OR TOO FAR TO TRAVEL/ 4 NOT ENOUGH MONEY FOR DOCTOR, PHU, or MEDICINES/ 5 DON'T LIKE GOING TO PHU, DISPENSER, HOSPITAL/ 6 THINK MEDICINES UNAVAILABLE AT PHU/ 7 DOCTOR NOT EFFECTIVE (TRADITIONAL TREATMENT IS MORE EFFECTIVE FOR THIS PROBLEM)/ 8 KNEW SELF-TREATMENT/ 9 OTHER (SPECIFY)/ 10 PHU WAS CLOSED/ 99 DON'T KNOW

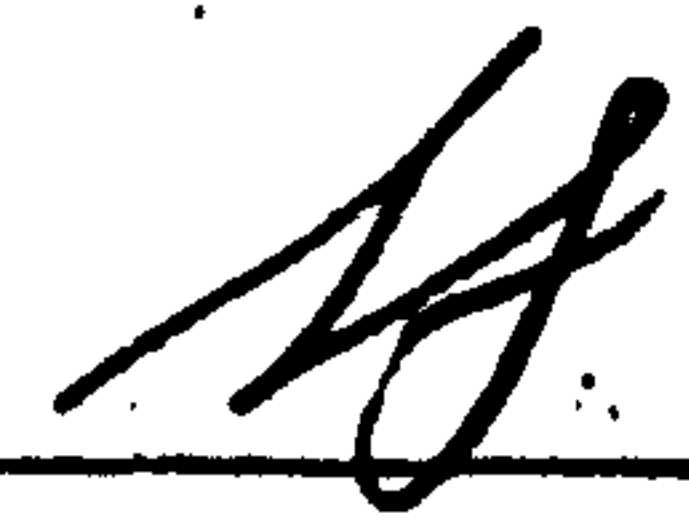
IF ABOVE ANSWER WAS 4, ask how much they thought it would have cost:

AMOUNT THOUGHT would have COST TREATMENT & TRANSPORT	Le: <u> </u>	Le: <u> </u>	Le: <u> </u>	Le: <u> </u>
--	-----------------	-----------------	-----------------	-----------------

(don't know - 999)

NEXT ACTION: * NEXT ACTION: *

SUPERVISOR: IF IT SEEMS LIKE A DEATH OCCURRED BECAUSE NOT ENOUGH MONEY WAS AVAILABLE TO GO TO HOSPITAL, GO BACK TO INTERVIEW THE FAMILY AGAIN AND WRITE A BRIEF REPORT.

Supervisor: 

CHF: BHK: BUY: ✓ VILLAGE/TOWN:

VILL NR: 2 HH NR: 26

MODULE 3: Enumerator: Fill in before going on

4. CONSTRUCTION OF HOUSE(S)

a. Number of rooms occupied by household, including parlor and any extensions or outbuildings 6

b. Wall construction 5
1 mud and wattle, 2 mud brick, 3 rice or boards, 4 mud brick or wattle with plaster, 5 concrete

c. Enter "2" if Fresh Paint on Walls 1

d. Roof material 3
1: thatch, 2: rice, 3: concrete

Supervisor Total 15

e. Floor material 1
1: mud, 2: tiles or concrete

f. Enter "3" for Private well or Tap 1

5. Judging only from the appearance of the house, the way people are dressed, and the way the house is arranged, is this household: 3

1 Better than average 2 About average 3 Better-off than average 4 Unable to say

"Pa (nanny) as ah bin say, all waytin you tell me today nar between me en you. Even di people dem way go read dis paper nor go know say nar you particular tell me anytin. So no fraid for tell me de true. Mek we talk lilibit but the money situation nar you ose."

("As I said, all of this information is confidential. Now I want to ask you some more questions about your household's money situation.")

6. "De big man (big woman) nar dis ose, watin nar de main wote way he depend pan for ina living en for feed dis ose?" (What is the major occupation of the household head?) 1

(USE THESE CODES FOR ALL OCCUPATION QUESTIONS)

1 FARMER, 2 MINER, 3 PETTY TRADER, 4 LARGE TRADER, 5 FISHERMAN/HUNTER, 6 SENIOR CIVIL SERVANT, 7 JUNIOR C.S., 8 SKILLED CRAFTSMAN, 9 LABORER/COOK, 10 DRIVER, 11 LIVES AWAY AND SENDS MONEY, 12 COMMERCIAL EMPLOYEE OR TEACHER, 13 GOVERNMENT/COAL MINER, 14 OTHER (specify), 15 NONE, UNEMPLOYED, OR RETIRED, 16 CHIEFMAN OR COURT OFFICIAL, 17 ALPHAMAN, 18 BOOTMAKER, 19 DON'T KNOW

b. Tell me de oder wote dem way you dey do 3
(Side occupations of household head)

c. "Oodat en oodat again nar dis ose lek you waf dey tradin, or oder person way day wote or tradin dey bring money cam nar dis ose? "Oonar get any oder person way nor day nar dis ose, sen money cam nar dis ose (ah ain lek onar get person nar England or America or even Nigeria or Salone or any oder sie, kin bring or sen money nar dis ose? (Which other household members or other family members usually contribute cam to the household?)

ENTER THE NUMBER OF OTHER PEOPLE WHO CONTRIBUTE 3 (should tally with number of boxes filled below)

ENTER THE OCCUPATIONS OF EACH 1 1 1

7 Supervisor

CHF: BMK: BUY: ☒ VILLAGE/TOWN: Burek VILL NR: 2 HH NR: 25

7. If the head of any other member of the household is a rice, coffee, or cacao farmer, ask the following:

a. FOR RICE: How many bushels planted by all household members? 9 bushels

b. FOR COCOA: How much was sold last year? bags OR Lb:

Any cash crop ☒

c. FOR COFFEE: How much was sold last year? bags OR Lb:

d. FOR PALM OIL: Produced for own use only (Y/N): Y
Produced for sale tins OR Lb:

(999 = don't know or did not answer)

8. Any large livestock owned (Y/N): Y Any fowl? Y

9. If the head of household is a rice farmer:

For how many months do you have to buy rice to feed the household? 3

10. Does anyone in the household own: (working condition or not)
(FILL IN NUMBERS OWNED)

Supplied from job?

a. Bicycle	<u>1</u>	(1)	
b. Motorbike	<u>1</u>	(3)	<u> </u> (-2)
c. Radio/cassette	<u>1</u>	(1)	
d. Cart or wheelbarrow	<u>1</u>	(1)	
e. Watches/clock	<u>1</u>	(x1)	
f. Sewing machine	<u>1</u>	(2)	
g. Motorcar/lorry	<u>1</u>	(6)	<u> </u> (-5)

Ask in urban or mining areas:

h. Television/video	<u> </u>	(2)
i. Generator	<u> </u>	(2)
j. Refrig/freezer	<u> </u>	(2)
k. Machinery	<u> </u>	(6)

Supervisor Total: 2

11. IF A WIFE, COOK OR OTHER RESPONSIBLE PERSON CAN BE INTERVIEWED, ASK HER IF SHE BUYS FOOD EVERY DAY. IF YES, ASK:

How much did you spend yesterday on: (Enter 999 for "don't know")

Rice Lb:

Cassava/garri/potatoes/other tubers Lb:

INGREDIENTS FOR SOUP/SAUCE Lb: 88

Onions	6
fish	20
mayo	4
palm oil	40
salt	2
ground nut	16
	<u>88</u>

12. How many meals were eaten by the household yesterday? (adults): 2

9

Supervisor

CHF: BHK: BUY: ✓ VILLAGE/TOWN: MABurrah VILL.NR: 2 HH NR: 29

MODULE 4:

16. "Nar plenty sie, en plenty country some people so po dat den no able pay anytin for sen densef when den sick. You tink say people lek dey wan day for get free mærecin nar hospital, or den for pay any small tin way den able, or den, pa o pa, for pay de same lek oder people?"

(In most places there are some people who are poorer than others, and who may not be able to pay anything at all when they are sick. Do you think those people should get free medicines, or have to pay some small amount, or pay as much as everyone else?) 1

1 = Pay some small amount of money 2 = Pay nothing 3 = Pay as much as everyone else 4 = don't know

IF 1 or 2, ASK QUESTION 17 IF 3, SKIP QUESTION 17:

17. "Nar buy we ministry for wellbody business day buy mærecin en nar wit de money way people pay for mærecin. So if po people pay money way nor equal to the cost of the mærecin way den buy den other people way able manage for pay lilibit more den way tin de mærecin cost. You tink dat right?" USE EXAMPLE:

(The Ministry of Health has to buy medicine with the money that is collected from the people. If poor people pay less than the cost of the medicine, it means that PEOPLE WHO ARE AVERAGE have to pay a little more. Do you still think that this is right and fair?)

(Y/N) Y

18. "Ten kin day nar de year way people kin get plenty money; oder ten nar de year den same people yar den han kin dry. Nus month you kin bill up way oonar kin get plenty for eat? Nus month you han kin dry?"

(Many people only have money at certain parts of the year, like after the crops are sold. Do you know which months you have the most money or the most to eat, and when you have the least?)

CAN GIVE ANSWER? (Y/N) Y Not Applicable

- Most: Nov to March

Least: May to Oct

a. "You know lek oraos so di bigaan (big oonan) nar dis ose kin get when he bill up true true wan? Lek oraos so?" (How much money does the household head usually have in the pocket during the (most plentiful) months?)

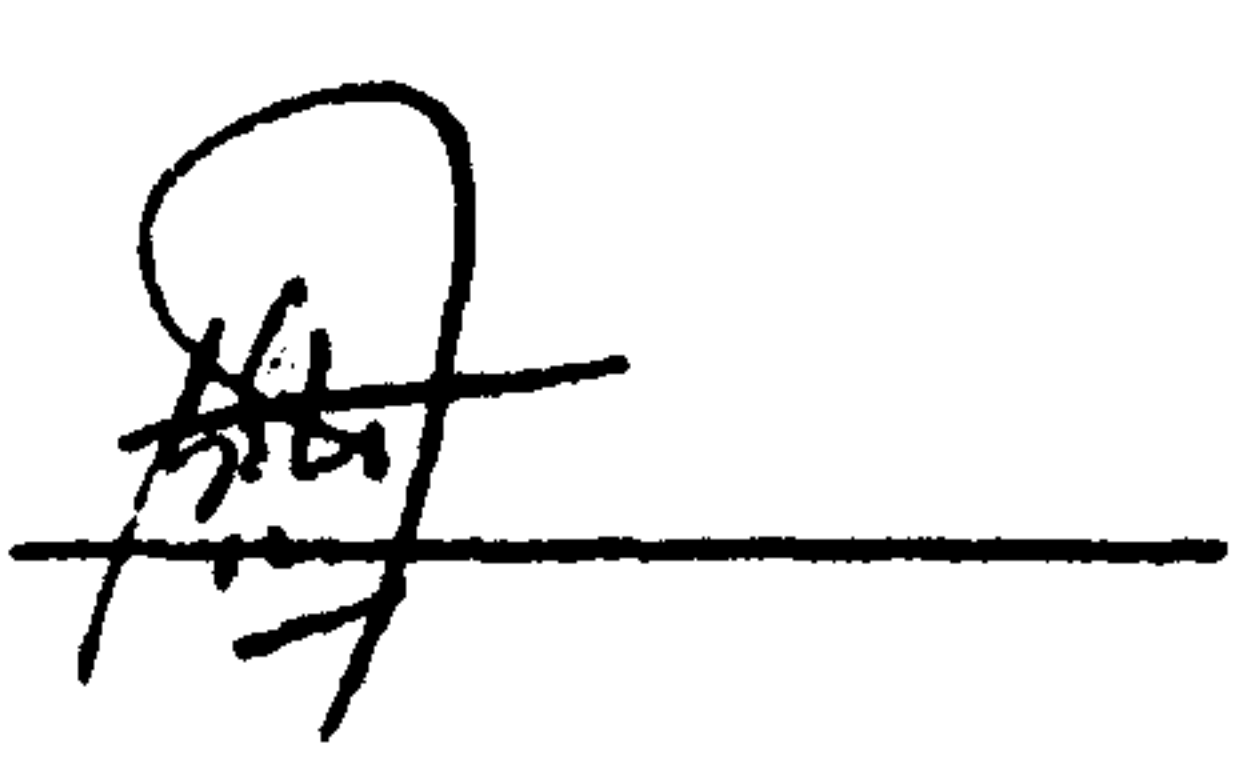
Le: 400 don't know

b. "When is han dry oraos so you go say kin day nar im han?" (How much money does the household head usually have in the pocket in the hungry season?)

Le: 100 don't know

3230

Supervisor



VILLAGE NAME _____ HOUSE NR. _____ PAGE 1

Sierra Leone Health Economics Survey
MOH/PHISU - UNICEF - LSHTM
Rainy Season Followup

Enumerator _____ (No. | _____ |) Date ____/____/1990

"We want to ask you some questions which will help us learn about what people here do when they get sick. The information will only be used to help us learn more about the health problems in this chiefdom, and all your answers will be confidential. I will not even write your name on this paper if you prefer. Will you help us by trying to give us only correct answers?"

Status in household of the person interviewed _____ | _____ | * Sex | _____ |
*CODES: 1-head 2-spouse 3-child 4-parent of head 5-other relative 6-other

Household structure: *** IDENTIFY THE WIVES OF HEAD WITH (W1), AND OTHER WIVES BY (W2) ***

MODULE 2

WIND THE LIST OF SYMPTOMS FIRST

First Names of All household members	Age or A	Sex (M/F)	Go To School?	ACUTE illness last 2 weeks	SERIOUS? Y.N.Chr.DK
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					

Supervisor:
TOTAL | _____ |

0-15 | _____ |

Schl | _____ |

S.Ill | _____ |

NS.Ill | _____ |

U1 YEAR | _____ |

U5 YEAR | _____ |

U10 YEAR | _____ |

ENUMERATOR:
number chronic-
ally ill
untreated
working adults
| _____ |

CHECKED BY SUPERVISOR _____

VILLAGE NAME _____ HOUSE NR. _____ PAGE 2

Age|____|Sex|____|Ill|____|Sr|____| *Age|____|Sex|____|Ill|____|Sr|____|

PATIENT Nr. 1 Name _____ *PATIENT Nr. 2 Name _____
FIRST SECOND FIRST SECOND
ACTION ACTION ACTION ACTION

ACTION TAKEN: |____| |____| * |____| |____|

1 GOVERNMENT HOSPITAL 4 DRESS FROM MARKET/PEOPLE 7 NATIVE HERBS, SALT, ETC 10 NO TREATMENT-
2 PHU 5 TRADITIONAL HEALER/HERBALIST 8 PRIVATE DOCTOR/HOSPITAL 99 DON'T REMEMBER/DON'T KNOW
3 MISSION HOSPITAL 6 DISPENSER/NURSE (PRIVATELY) 9 HAD MEDICINE AT HOME

RESULT: |____| |____| * |____| |____|
1 GOT BETTER 2 GOT SLIGHTLY BETTER 3 GOT WORSE 4 REMAINED THE SAME 5 STILL UNDER TREATMENT 6 DIED 99 DON'T KNOW

PAYMENTS: (DON'T KNOW = 999)
AMOUNT CHARGED Le|____| Le|____| * Le|____| Le|____|
PAID/OWED PROVIDER Le|____| Le|____| * Le|____| Le|____|
PAID MEDICINES Le|____| Le|____| * Le|____| Le|____|
PAID ALL TRAVEL Le|____| Le|____| * Le|____| Le|____|
OTHER COSTS Le|____| Le|____| * Le|____| Le|____|
TOTAL Le|____| Le|____| * Le|____| Le|____|

RECEIVED INJECTION? (Y/N) |____| |____| * |____| |____|

WAS ENOUGH MONEY AVAILABLE |____| |____| * |____| |____|
in house or savings? (Y/N)

|>If YES, which household
| number provided the money? |____| |____| |____| |____| * |____| |____| |____| |____|
1 HOUSEHOLD HEAD 2 CHILD'S MOTHER 3 SICK PERSON 4 OTHER

|>If answer was NO,
HOW WAS MONEY OBTAINED? |____| |____| |____| |____| * |____| |____| |____| |____|

1 SOLD RICE/FOOD CROP 7 BORROW FROM NEIGHBOUR 13 REDUCED OTHER PURCHASES 18 PAID IN KIND
2 SOLD/PLEGGE CASE CROP ** 8 INC/OUT GIFT/SUBSCRIPTION 14 DEDUCTED FROM SALARY 19 PLEDGED PLANTATION/VEG
3 SOLD POSSESSIONS 9 BORROW RELATIVE/FRIEND 15 ON TRUST-WILL PAY AFTER TREATMENT IS COMPLETED 20 DID EXTRA LABOUR
4 SOLD LAND/TOOLS (see 19) 10 PRODUCED/CFT FOR SALE 16 HAD SOME MONEY AT HOME 98 OTHER (SPECIFY)
5 PLEDGED OTHER PROPERTY 11 SOLD LIVESTOCK/POUL 17 USED BUSINESS CAPITAL 99 DON'T REMEMBER/DON'T KNOW
6 BORROW BANK/ON CREDIT 12 REDUCED FOOD PURCHASES

** IF A GIFT OR LOAN WAS RECEIVED,
SPECIFY FROM WHOM |____| |____| * |____| |____|
IF THE ACTION TAKEN WAS 4, 5, 7, OR 10, COMPLETE THE NEXT PART

MAIN REASON FOR THIS CHOICE |____| |____| * |____| |____|
1 THOUGHT NOT SERIOUS/ 2 GOT BETTER SOON AFTER BEING SICK/ 3 HAD MONEY BUT NO TRANSPORT AVAILABLE, OR TOO FAR TO TRAVEL/
4 NOT ENOUGH MONEY FOR DOCTOR, PHU, or MEDICINES/ 5 DON'T LIKE GOING TO PHU, DISPENSER, HOSPITAL/ 6 THINK MEDICINES
UNAVAILABLE AT PHU/ 7 DOCTOR NOT EFFECTIVE (TRADITIONAL TREATMENT IS MORE EFFECTIVE FOR THIS PROBLEM)/ 8 KNEW SELF-
TREATMENT/ 9 OTHER (SPECIFY)/ 10 PHU WAS CLOSED/ 99 DON'T KNOW

If above answer was 4,
AMOUNT THOUGHT would have Le|____| Le|____| * Le|____| Le|____|
cost for TREATMENT & TRANSPORT (999 = don't know)

NEXT ACTION? * NEXT ACTION?

CHECKED BY SUPERVISOR _____

VILLAGE NAME _____ HOUSE NR. _____ PAGE 3

Age|____|Sex|____|Ill|____|Sr|____| *Age|____|Sex|____|Ill|____|Sr|____|

PATIENT Nr. 3 Name _____ *PATIENT Nr. 4 Name _____

FIRST SECOND FIRST SECOND
ACTION ACTION ACTION ACTION

ACTION TAKEN:

1 GOVERNMENT HOSPITAL 4 DRUGS FROM MARKET/PEDDLER 7 NATIVE HERBS, SALT, ETC 10 NO TREATMENT
2 PHU 5 TRADITIONAL HEALER/HERBALIST 8 PRIVATE DOCTOR/HOSPITAL 99 DON'T REMEMBER/DON'T KNOW
3 MISSION HOSPITAL 6 DISPENSER/NURSE (PRIVATELY) 9 HAD MEDICINE AT HOME

RESULT:

1 GOT BETTER 2 GOT SLIGHTLY BETTER 3 GOT WORSE 4 REMAINED THE SAME 5 STILL UNDER TREATMENT 6 DIED 99 DON'T KNOW

PAYMENTS:

(DON'T KNOW = 999)

AMOUNT CHARGED Le|____| Le|____| * Le|____| Le|____|
PAID/OWED PROVIDER Le|____| Le|____| * Le|____| Le|____|
PAID MEDICINES Le|____| Le|____| * Le|____| Le|____|
PAID ALL TRAVEL Le|____| Le|____| * Le|____| Le|____|
OTHER COSTS Le|____| Le|____| * Le|____| Le|____|
TOTAL Le|____| Le|____| * Le|____| Le|____|

RECEIVED INJECTION? (Y/N)

WAS ENOUGH MONEY AVAILABLE

In house or savings? (Y/N)

|>If YES, which household

| member provided the money? |____| |____| |____| |____| * |____| |____| |____| |____|
| 1 HOUSEHOLD HEAD 2 CHILD'S BROTHER 3 SICK PERSON 4 OTHER

|>If answer was NO,

HOW WAS MONEY OBTAINED? |____| |____| |____| |____| * |____| |____| |____| |____|

1 SOLD RICE/POOD CROP 7 BORROW FROM MORTGAGE 13 REDUCED OTHER PURCHASES 18 PAID IN KIND
2 SOLD/PLEGDED CASH CROP ** 8 BOR/OUT GIFT/SUBSCRIPTION 14 DEDUCTED FROM SALARY 19 PLEDGED PLANTATION/FARM
3 SOLD POSSESSIONS 9 BORROW RELATIVE/FRIEND 15 ON TRUST-WILL PAY AFTER TREATMENT IS COMPLETED 20 DID EXTRA LABOUR
4 SOLD LAND/TOOLS (see 19) 10 PRODUCED/CUT FOR SALE 16 HAD SOME MONEY AT HOME 99 OTHER (SPECIFY)
5 PLEDGED OTHER PROPERTY 11 SOLD LIVESTOCK/TOOL 17 USED BUSINESS CAPITAL 99 DON'T REMEMBER/DON'T KNOW
6 BORROW BANK/ON CREDIT 12 REDUCED FOOD PURCHASES

** IF A GIFT OR LOAN WAS RECEIVED,

SPECIFY FROM WHOM

IF THE ACTION TAKEN WAS 4, 5, 7, OR 10, COMPLETE THE NEXT PART

MAIN REASON FOR THIS CHOICE

1 THOUGHT NOT SERIOUS/ 2 GOT BETTER SOON AFTER BEING SICK/ 3 HAD MONEY BUT NO TRANSPORT AVAILABLE, OR TOO FAR TO TRAVEL/
4 NOT ENOUGH MONEY FOR DOCTOR, PHU, or MEDICINES/ 5 DON'T LIKE GOING TO PHU, DISPENSER, HOSPITAL/ 6 THINK MEDICINES
UNAVAILABLE AT PHU/ 7 DOCTOR NOT EFFECTIVE (TRADITIONAL TREATMENT IS MORE EFFECTIVE FOR THIS PROBLEM)/ 8 CHOSE SELF-
TREATMENT/ 9 OTHER (SPECIFY)/ 10 PHU WAS CLOSED/ 99 DON'T KNOW

If above answer was 4.

AMOUNT THOUGHT would have Le|____| Le|____| * Le|____| Le|____|
cost for TREATMENT & TRANSPORT (999 = don't know)

NEXT ACTION?

* NEXT ACTION?

CHECKED BY SUPERVISOR _____

VILLAGE NAME _____ HOUSE NR. _____ PAGE 6

DEATH RECORD

Has any member of this household DIED in the last 12 months, including newborns and infants? (Y/N) |__|

DECEASED Nr. 1 Age |__| Sex |__| *
CAUSE OF DEATH: |__| *
FIRST SECOND FIRST SECOND
ACTION ACTION ACTION ACTION
ACTION TAKEN: |__| |__| *
1 GOVERNMENT HOSPITAL 4 DRUGS FROM MARKET/PEDDLER 7 NATIVE HERBS, SALT, ETC 10 NO TREATMENT
2 PHU 5 TRADITIONAL HEALER/HERBALIST 8 PRIVATE DOCTOR/HOSPITAL 99 DON'T REMEMBER/DON'T KNOW
3 MISSION HOSPITAL 6 DISPENSER/NURSE (PRIVATELY) 9 HAD MEDICINE AT HOME

PAYMENTS: (DON'T KNOW = 999)
TOTAL ALL COSTS Le |__| Le |__| *
ENOUGH MONEY AVAILABLE (Y/N) |__| |__| *
in house or savings?
If above answer was NO,
HOW WAS MONEY OBTAINED? |__| |__| |__| |__| *
1 SOLD RICE/FOOD CROP 7 BORROW FROM MONEYLENDER 13 REDUCED OTHER PURCHASES 18 PAID IN KIND
2 SOLD/PLEGDED CASH CROP 8 BBS/GET GIFT/SUBSCRIPTION 14 DEDUCTED FROM SALARY 19 PLEDGED PLANTATION/TAX
3 SOLD POSSESSIONS 9 BORROW RELATIVE/FRIEND 15 ON TRUST-WILL PAY AFTER TREATMENT IS COMPLETED 20 DID EXTRA LABOUR
4 SOLD LAND/TOOLS (see 19) 10 PRODUCED/CUT FOR SALE 16 HAD SOME MONEY AT HOME 99 OTHER (SPECIFY)
5 PLEDGED OTHER PROPERTY 11 SOLD LIVESTOCK/TOOL 17 USED BUSINESS CAPITAL 99 DON'T REMEMBER/DON'T KNOW
6 BORROW BANK/OR OTHER 12 REDUCED FOOD PURCHASES

IF THE ACTION TAKEN WAS 4, 5, 7, OR 10, COMPLETE THE NEXT PART

MAIN REASON FOR THIS CHOICE |__| |__| *
1 THOUGHT NOT SERIOUS/ 2 GOT BETTER SOON AFTER BEING SICK/ 3 HAD MONEY BUT NO TRANSPORT AVAILABLE, OR TOO FAR TO TRAVEL/
4 NOT ENOUGH MONEY FOR DOCTOR, PHU, or MEDICINES/ 5 DON'T LIKE GOING TO PHU, DISPENSER, HOSPITAL/ 6 THINK MEDICINES
UNAVAILABLE AT PHU/ 7 DOCTOR NOT EFFECTIVE (TRADITIONAL TREATMENT IS MORE EFFECTIVE FOR THIS PROBLEM)/ 8 KNEW SELF-
TREATMENT/ 9 OTHER (SPECIFY)/ 10 PHU WAS CLOSED/ 99 DON'T KNOW

If above answer was 4 (Not enough money):
AMOUNT THOUGHT would have Le |__| Le |__| *
cost for TREATMENT & TRANSPORT (999 = don't know) *
NEXT ACTION? * NEXT ACTION?

CHECKED BY SUPERVISOR _____

Module 3

CONSTRUCTION OF HOUSE(S)

- a. Number of rooms occupied by household, including parlor and any extensions or outbuildings
- b. Wall construction
1 mud and wattle 2 mud brick 3 zinc or boards 5 mud brick or wattle with plaster 7 concrete
- c. Enter "2" if there is fresh paint on the walls Supervisor Total
- d. Roof Material
1 thatch 3 zinc 4 concrete
- e. Floor material
1 mud 3 tiles or concrete
- f. Enter "3" for private well or tap

*** Does this household have its own latrine? (y/n)
*** Do you own or rent this house? If rented, how much?

Judging only from the appearance of the house, the way people are dressed, and the way the house is arranged, is this household:

1 Poorer than average 2 About average 3 Better-off than average 4 Unable to say

"Pa (mummy) as ah bin say, all waytin you tell me today nar between me en you. Even di people dem way go read dis paper nor go know say nar you particular tell me anytin. So no fraid for tell me de true. Mek we talk lilibit but the money situation nar you ose." ("As I said, all of this information is confidential. Now I want to ask you some more questions about your household's money situation.")

"De big men (big ooman) nar dis ose, watin nar de main woke way he depend pan for ina living en for feed dis ose?" (What is the major occupation of the household head?)

(USE THESE CODES FOR ALL OCCUPATION QUESTIONS)

1 FARMER, 2 MINER, 3 PETTY TRADER, 4 LARGE TRADER, 5 FISHERMAN/HUNTER, 6 SENIOR CIVIL SERVANT, 7 JUNIOR C.S., 8 SKILLED CRAFTSMAN, 9 LABOR/GUARD, 10 DRIVER, 11 LIVES AWAY AND SENDS MONEY, 12 COMMERCIAL EMPLOYEE OR TEACHER, 13 WOODCUTTER/COAL BURNER, 14 OTHER (specify), 15 BOSS, UNEMPLOYED, OR RETIRED, 16 CHIEFMAN OR COURT OFFICIAL, 17 ALPHAMAN, SOOTHSEAYER, 99 DON'T KNOW

Tell me de oder woke dem way you dey do
(Side occupations of household head)

"Oodat en oodat again nar dis ose lek you waf day tradin, or oder person way day woke or tradin day bring money cam nar dis ose? "Oonar get any oder person way nor day nar dis ose, sen money cam nar dis ose (ah min lek onar get porson nar England or America or even Nigeria or Salone or any oder sie, kin bring or sen money nar dis ose? (Which other household members or other family members usually contribute cash to the household?)

ENTER THE NUMBER OF OTHER PEOPLE WHO CONTRIBUTE (should tally with number of boxes filled below)

ENTER THE OCCUPATIONS OF EACH

CHECKED BY SUPERVISOR _____

VILLAGE NAME _____ HOUSE NR. _____ PAGE 8

If the head or any other member of the household is a rice, coffee, or cacao farmer, ask the following: (999 = don't know or did not answer)

FOR RICE: How many bushels planted by all household members? |____| bushels

FOR COCOA: How much was sold last year? |____| bags OR Le|____|

FOR COFFEE: How much was sold last year? |____| bags OR Le|____|

Any other CASH CROPS grown (whether for sale or not) (Y/N) |____|

If any was sold, how much money was earned? Le|____|

FOR PALM OIL: Produced for own use only (Y/N) |____|

Produced for sale |____| tins OR Le|____|

Any large livestock owned (Y/N) |____| Any fowl? |____|

Besides the work and the crops you have already mentioned, how else do people in this household get money to buy food, clothes, and other things like matches, soap, and so on?

If the head of household is a rice farmer:

For how many months do you have to buy rice to feed the household? |____|

Does anyone in the household own: (working condition or not)
(FILL IN NUMBERS OWNED)

		Supplied from job?
A. Bicycle	____ (1)	
B. Motorbike	____ (3)	____ (-2)
C. Radio/cassette	____ (1)	
D. Cart or wheelbarrow	____ (1)	
E. Watches/clock	____ (x1)	
F. Sewing machine	____ (2)	
G. Motorcar/lorry	____ (6)	____ (-5)

Ask in urban or mining areas:

H. Television/video	____ (2)	Supervisor Total: ____
I. Generator	____ (2)	
J. Refrig/freezer	____ (2)	
K. Machinery	____ (6)	

IF A WIFE, COOK OR OTHER RESPONSIBLE PERSON CAN BE INTERVIEWED, ASK HER IF SHE BUYS FOOD EVERY DAY. IF YES, ASK:

How much did you spend yesterday on: (Enter 999 for "don't know")

Rice Le|____|

Cassava/garri/potatoes/other tubers Le|____|

INGREDIENTS FOR SOUP/SAUCE Le|____| (If zero, explain why _____)

How many meals were eaten by the household yesterday? (adults) |____|

CHECKED BY SUPERVISOR _____

VILLAGE NAME _____ HOUSE NR. _____ PAGE 9

Has this household had any feasts or ceremonies (including special festivals) in the last 12 months? (Y/N) |__| IF YES,

How much did people in this household spend on it (them)?

Cash Le|_____|

Quantity rice supplied |_____|

Other |_____|

Supervisor Total Le|_____|

How did you manage to get money for the feast(s)/ceremony? |__||__||__|

- | | | | |
|--------------------------|---------------------------|----------------------------|----------------------------------|
| 1 SOLD RICE/POOD CROP | 6 BORROW BANK/OR QSOSE | 11 SOLD LIVESTOCK/POUL | 16 HAVE MOST MONEY AT HOME |
| 2 SOLD/PLEDGED CASH CROP | *** 7 REC/GFT GIFT | 12 REDUCED FOOD PURCHASES | 19 PLEDGED FARM/PLANTATION |
| 3 SOLD POSSESSIONS | 8 BORROW FROM MONEYLENDER | 13 REDUCED OTHER PURCHASES | 20 DID EXTRA LABOUR |
| 4 SOLD LAND/FARM TOOLS | 9 PLEDGED OTHER PROPERTY | 14 DEDUCTED FROM SALARY | 98 OTHER (SPECIFY) |
| 5 BORROW RELATIVE/FRIEND | 10 PRODUCED/CUT FOR SALE | 15 OBTAINED ON TRUST | 99 DON'T KNOW/REMEMBER |
| | | | *** IF A GIFT, SPECIFY FROM WHOM |

(USE THE SAME CODES FOR THE NEXT TWO QUESTIONS)

Besides the illnesses or deaths already mentioned, in the last 12 months, has anyone in the household had to pay for some emergency, such as a FUNERAL (1), TREATMENT FOR ANY ILLNESS (2), ACCIDENT (3), or VILLAGE DISPUTE (4), or any OTHER EMERGENCY (5)? IF YES,

What was the emergency? |__|

How much did it cost? Le|_____|

How did you manage to get the money to pay? |__||__||__|

If borrowed, was it on an interest basis or repaid in kind? Y/N|__|

Did any members of this household buy clothing or shoes in the last year? (Y/N) |__|

	<u>amount spent</u>	<u>how the money was obtained</u>
Clothing/shoes for household head	Le _____	__ __
Clothing/shoes for spouse(s)	Le _____	__ __
Clothing/shoes for all children	Le _____	__ __

If the respondent is head of household, ask the following:

How much do you owe other people? Le:|_____| In-kind:(estimate value)Le:|_____|

How much do other people owe you? Le:|_____| In-kind:(estimate value) Le|_____|

If (God forbid) there was a serious illness or emergency in this house tomorrow which would cost 500 Leones, what would you do to get the money?

|__||__||__|

CHECKED BY SUPERVISOR _____

VILLAGE NAME _____ HOUSE NR. _____ PAGE 10

MODULE 4: ASK FOR HOUSE NUMBERS ENDING IN 1, 2, 3, AND 4

"Nar plenty sie, en plenty country some people so po dat den no able pay anytin for men densef when den sick. You tink say people lek dey wan day for get free merecin nar hospital, or dem for pay any small tin way den able, or dem, pa o pa, for pay de same lek oder people?"

(In most places there are some people who are poorer than others, and who may not be able to pay anything at all when they are sick. Do you think those people should get free medicines, or have to pay some small amount, or pay as much as everyone else?)
|____|

1 = Pay some small amount of money 2 = Pay nothing 3 = Pay as much as everyone else 4 = don't know

IF 1 or 2, ASK QUESTION 17 IF 3, SKIP QUESTION 17:

"Nar buy we ministry for wellbody business day buy merecin en nar wit de money way people pay for merecin. So if po people pay money way nor equal to the cost of the merecin way dem buy den other people way able manage for pay lilibit more dan way tin de merecin cost. You tink dat right?" USE EXAMPLE:

(The Ministry of Health has to buy medicine with the money that is collected from the people. If poor people pay less than the cost of the medicine, it means that PEOPLE WHO ARE AVERAGE have to pay a little more. Do you still think that this is right and fair?)

(Y/N) |____|

"Tem kin day nar de year way people kin get plenty money; oder tem nar de year den same people yar dem han kin dry. Was month you kin bill up way conar kin get plenty for eat? Was month you han kin dry?"

(Many people only have money at certain parts of the year, like after the crops are sold. Do you know which months you have the most money or the most to eat, and when you have the least?)

Most: |____| to |____| DON'T KNOW |____|

Least |____| to |____| DON'T KNOW |____|

"You know lek ormos so di bigman (big ooman) nar dis ose kin get when he bill up true true wan? Lek ormos so?" (How much money does the household head usually have in the pocket during the (most plentiful) months?)

Le|____| don't know |____|

"When im han dry ormos so you go say kin day nar im han?" (How much money does the household head usually have in the pocket in the hungry season?)

Le|____| don't know |____|

CHECKED BY SUPERVISOR _____

Sierra Leone Health Economics Survey

19/12/89

VILLAGE LEVEL DATA: Village Name YIBIEMA Nr 7 CHF: BMK BUY LAN MAL

Population _____

Distance to PHU(s) miles About 2 1/2 miles to Yabaima

Walking time to PHU(s) 50 mins - 1 hr walk

Cost of transport to PHU 2-10 keones during the rough waters

Distance to all hospitals mentioned as used 21 miles to Blama / 33 miles to Kenema

Cost of transport to hospital Le 200.00 to Blama / Le 300.00 to Kenema Hosp.

Walking time to hospital 4-5 hrs walk to Blama / About 7 hrs journey to Ken. Hosp

Herbalists/traditional practitioners working in village? NO

Drug peddlers working in village or nearby? They do come here once on a week

Distance to nearest market where farm produce can be sold or bought 21 miles to Blama

Transport available in village for produce (Y/N)? No They usually come from and back

Other transport available? Once on a while.

Any actual aid? No

Dispenser's statement of average treatment costs, or by most common problems _____

Daily agricultural labour wage Le 75
There are labour groups out for higher
depending on the size - charges Le 50.00 - Le 800.00 plus
feeding for that day for 8-11 people

$$\frac{400}{8} = 75 \quad \frac{800}{11} = 73$$

Market - No

School - Primary School

Mosque - Yes

Any large traders or Cash Crop buyers in town - NO

Any -private -practitioner in Town. - NO

1 bag Coffee Le 1200

Appendix 7:

Official PHC Drug Price List, September 1989

Ministry of Health Essential Drugs Programme Cost Recovery Drugs:
Price list effective September 1969

D. Price List for Patients (for public display)

Item No.	Description	Cost to patient per tablet, capsule or injection
01	Acetylsalicylic acid tablet, 300mg	Le 0.20
02	Aluminium hydroxide tablet, 500mg	Le 0.80
03	Chloramphenicol capsule, 250mg	Le 2.00
04	Chloroquine tablets, 150mg	Le 0.90
05	Sulfamethoxazole + trimethoprim tablet, 400mg + 80mg	Le 1.80
06	Metronidazole tablet, 100mg	Le 1.20
07	Ferrous sulphate + folic acid tablet, 60mg + 0.25mg	Le 0.20
08	Metronidazole tablet, 250mg	Le 1.00
09	Sulfadiazine tablet, 500mg	Le 1.00
10	Diazepam tablet, 5mg	Le 1.40
11	Chlorpheniramine tablet, 4mg	Le 0.20
12	Tetracycline capsule 250mg	Le 1.50
13	Ampicillin capsule 250mg	Le 3.60
14	Folic acid tablet 1mg	Le 0.20
15	Lidocaine inj. 2% vial 50ml	Le24.00
16	Benzyl penicillin pdr. for inj., 3g	Le64.00
17	Benzathine benzyl penicillin pdr. for inj. 1.44g	Le92.00
18	Streptomycin pdr. for inj. 1g	Le10.00
19	Needles hypo 203 x 1 1/2"	Free
20	Syringes hypo 2ml	Free
21	Syringes hypo 5ml	Free
22	Benzoic acid + salicylic acid ointment 65 + 35 tube 40g	Le62.00
23	Benzyl benzoate lotion 20%	Le99.00
24	Calamine lotion	Le50.00 (50ml)
25	Gentian violet	Le 8.00 (1g mch up to 50ml)
26	Tetracycline eye ointment 1% tube 5g	Le24.00

(D. contd.)		Cost to patient per tablet, capsule or injection	
Item No.	Description		
27	Iodine soln.		
28	Chlorhexidine conc. soln.		
29	Cotton wool, absorbent non-sterile		
30	Gauze pad sterile 12ply		
31	Plaster surgical adhesive tape		
32	Bandage gauze non-sterile		
33	Tape, umbilical, non-sterile		
34	Ampicillin pdr. for oral susp; 125mg/5ml bottle 50ml	Le20.00 per dressing*	
35	Paracetamol tablet 500mg	Le85.00	
36	Chloroquine syrup 50mg/5ml	Le 1.40	
37	Envelopes for tablets, polythene	Le13.00 (50ml)	
38	Ergometrine tablet 0.125mg	Free	
39	Ergometrine inj. 0.2mg/ml 1ml amp.	Le 2.00	
40	Procaine benzyl penicillin pdr. for inj. 3g vial	Le 9.00	
41	Thiostathene + Isoniazid tablet 150mg + 300mg	Le32.00	
42	Chlorpheniramine tablet 4mg	Le 1.70	
43	Diethylcarbamazine tablet 50mg	Le 1.00	
44	Salbutamol tablet 4mg	Le 0.40	
45	Epinephrine HCl inj. 1mg/ml, 1ml amp.	Le 0.90	
46	Diazepam inj. 5mg/ml 2ml amp.	Le 9.00	
47	2.5% Breccate separated conc. soln.	Le12.00	
		Le13.00 (20ml)	

* A flat rate of Le20.00 per dressing should be charged to cover the cost of dressing materials/antiseptics.